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U.S. COMMISSION
OF LANDS

SENATE

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REPORT

EXPLORATIONS AND SURVEYS,

TO DETERMINE THE MOST PRACTICABLE AND ECONOMICAL ROUTE FOR A RAILROAD

FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

BY THE COMMISSIONERS OF THE GENERAL LAND OFFICE.

1853-5.

ACCORDING TO ACTS OF CONGRESS OF MARCH 3, 1846, MAY 18, 1846, AND AUGUST 8, 1846.

SUPPLEMENT TO VOLUME I.

WASHINGTON:
WILLIAM A. BROWN, PRINTER.
1853.



EXPERIMENTAL AND THEORETICAL

THEORY OF THE

OF THE

35TH CONGRESS, }
2d Session. }

SENATE.

{ Ex. Doc.
{ No. 46.

REPORTS

OF

EXPLORATIONS AND SURVEYS,

TO

ASCERTAIN THE MOST PRACTICABLE AND ECONOMICAL ROUTE FOR A RAILROAD

FROM THE

MISSISSIPPI RIVER TO THE PACIFIC OCEAN.

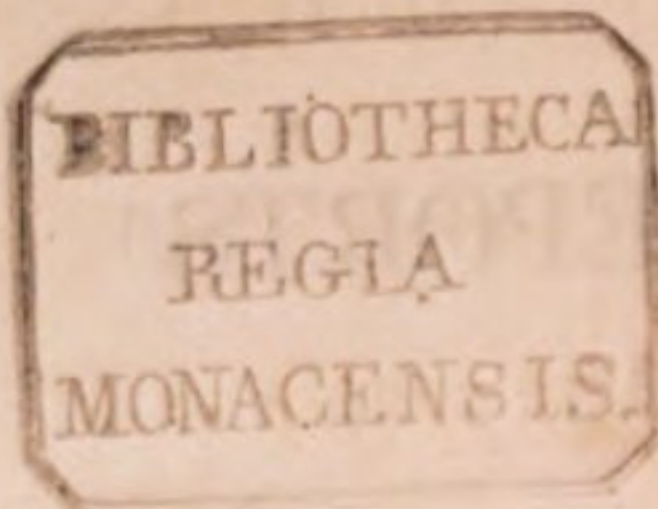
MADE UNDER THE DIRECTION OF THE SECRETARY OF WAR, IN

1853-5,

ACCORDING TO ACTS OF CONGRESS OF MARCH 3, 1853, MAY 31, 1854, AND AUGUST 5, 1854.

SUPPLEMENT TO VOLUME I.

WASHINGTON:
WILLIAM A. HARRIS, PRINTER.
1859.



EXPLORATIONS AND SURVEYS

ACQUISITION FOR THE NATIONAL ANTHROPOLOGICAL ARCHIVES FOR A BUREAU

MISSISSIPPI RIVER TO THE PACIFIC OCEAN

1853-5

SUPPLEMENT TO VOLUME I

WASHINGTON:
GEOGRAPHIC BOARD OF THE ARMY
1858

REPORT
OF
THE SECRETARY OF WAR,

COMMUNICATING,

In compliance with a resolution of the Senate, the narrative and final report of Governor Stevens of his survey and exploration of the northern route for a railroad from the Mississippi river to the Pacific ocean.

MARCH 1, 1859.—Read. Motion to print referred to the Committee on Printing.

MARCH 3, 1859.—Report in favor of printing submitted, considered, and agreed to.

WAR DEPARTMENT, *February 28, 1859.*

SIR: In compliance with a resolution of the Senate of this date, I have the honor, herewith, to communicate "the narrative and final report of Governor Stevens of his survey and exploration of the northern route for a railroad from the Mississippi river to the Pacific ocean."

Very respectfully, your obedient servant,

JOHN B. FLOYD,
Secretary of War.

HON. J. C. BRECKINRIDGE,
President of the Senate.

REPORT

THE SECRETARY OF WAR.

In compliance with a resolution of the Senate, the Secretary and Joint report of Governor Sherman, of the survey and exploration of the route for a railroad from the Mississippi river to the Pacific coast.

March 1, 1855 - First - Report to the Senate on the route for a railroad from the Mississippi river to the Pacific coast.

Very respectfully,
JOHN B. FLOYD
Secretary of War.

Hon. J. C. Barstow
President of the Senate

EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD
NEAR THE FORTY-SEVENTH AND FORTY-NINTH PARALLELS.

SUPPLEMENTARY REPORT

EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD,

CONTENTS OF SUPPLEMENT TO VOLUME I.

SUPPLEMENTARY REPORT BY I. I. STEVENS, GOVERNOR OF WASHINGTON TERRITORY, UPON THE ROUTE
NEAR THE FORTY-SEVENTH AND FORTY-NINTH PARALLELS.

ST. PAUL TO PUGET SOUND

I. I. STEVENS

GOVERNOR OF WASHINGTON TERRITORY

THE NATIONAL ARCHIVES
COLLECTION OF THE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

REPORT

EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD CONTENTS OF SUPPLEMENT TO VOLUME I

CONTENTS OF SUPPLEMENT TO VOLUME I
EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD
BY THE NATIONAL ARCHIVES
COLLECTION OF THE
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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WAR DEPARTMENT.

SUPPLEMENTARY REPORT

OF

EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD,

NEAR

THE FORTY-SEVENTH AND FORTY-NINTH PARALLELS OF NORTH LATITUDE,

FROM

ST. PAUL TO PUGET SOUND.

BY

I. I. STEVENS,
GOVERNOR OF WASHINGTON TERRITORY.

1855.

EXPLORATIONS AND SURVEYS FOR A RAILROAD ROUTE FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN
WAR DEPARTMENT

SUPPLEMENTARY REPORT

EXPLORATIONS FOR A ROUTE FOR THE PACIFIC RAILROAD

THE FORTY-SEVENTH AND FORTY-EIGHTH PARALLELS OF NORTH LATITUDE

ST. PAUL TO PUGET SOUND

J. I. STEVENS

BOULEVARD OF WASHINGTON TERRITORY

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LETTER TO THE SECRETARY OF WAR.

WASHINGTON CITY, D. C., *February 7, 1859.*

SIR: I have the honor to submit my final report of the explorations, made by me and under my direction, in the years 1853, 1854, and 1855, to determine the practicability of the northern route for a railroad to the Pacific.

I am, very respectfully, your most obedient,

ISAAC I. STEVENS.

Hon. JOHN B. FLOYD,

Secretary of War, Washington City.

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APPENDIX A.

TABLE OF DISTANCES AND DIRECTION

APPENDIX B.

METHEOROLOGICAL RECORDS

APPENDIX C.

LETTERS COMMUNICATING THE RESULTS OF THE SURVEY AND THE REPORT

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LETTER TO THE SENATE OF THE UNITED STATES

Washington City, D. C., February 1, 1859.
SIR: I have the honor to submit my final report of the explorations made by me and under my direction in the years 1855, 1856, and 1857 to determine the practicability of the northern route for a railroad to the Pacific.
I am, very respectfully, your most obedient servant,

ISAAC I. STEVENS

Hon. John B. Clark

Secretary of War, Washington City

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PART II.

BOTANICAL REPORT:

- No. 1.—Report upon the Botany of the Route. By J. G. COOPER, M.D.
No. 2.—Catalogue of Plants collected east of the Rocky Mountains. By Prof. ASA GRAY.
No. 3.—Catalogue of Plants collected in Washington Territory. By J. G. COOPER, M.D.

PART III.

ZOOLOGICAL REPORT:

- No. 1.—Report upon Insects collected on the Survey. By JOHN T. LECONTE, M.D.
No. 2.—Report upon the Mammals collected on the Survey. By J. G. COOPER, M.D., and Dr. SUCKLEY, U. S. A.
No. 3.—Report upon the Birds collected on the Survey. By J. G. COOPER, M.D., and Dr. SUCKLEY, U. S. A.
No. 4.—Report upon the Reptiles collected on the Survey. By J. G. COOPER, M.D.
No. 5.—Report upon the Fishes collected on the Survey. By Dr. G. SUCKLEY, U. S. A.
No. 6.—Report upon the Molusca collected on the survey. By WM. COOPER.
No. 7.—Report upon the Corustacia collected on the Survey. By J. G. COOPER, M.D.

APPENDICES.

APPENDIX A.

TABLE OF HEIGHTS AND DISTANCES.

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- No. 1—Report upon the history of the district. By J. C. Cooper, M.D.
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No. 3—Description of the fossils collected in the district. By J. C. Cooper, M.D.

PART III

MINERAL REPORT

- No. 1—Report upon the history of the district. By J. C. Cooper, M.D.
No. 2—Report upon the history of the district. By J. C. Cooper, M.D.
No. 3—Report upon the history of the district. By J. C. Cooper, M.D.
No. 4—Report upon the history of the district. By J. C. Cooper, M.D.
No. 5—Report upon the history of the district. By J. C. Cooper, M.D.
No. 6—Report upon the history of the district. By J. C. Cooper, M.D.
No. 7—Report upon the history of the district. By J. C. Cooper, M.D.

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PART I.

GENERAL REPORT.

THE UNIVERSITY OF CHICAGO PRESS

CHICAGO, ILL.

THE UNIVERSITY OF CHICAGO PRESS
1215 EAST 58TH STREET, CHICAGO, ILL. 60637

PART I.

GENERAL REPORT

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ERRATA.

EXPLORATIONS AND SURVEYS FOR A RAILROAD ROUTE FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.
WAR DEPARTMENT.

ROUTE NEAR FORTY-SEVENTH AND FORTY-NINTH PARALLELS, EXPLORED BY I. I. STEVENS, GOVERNOR
OF WASHINGTON TERRITORY, IN 1853-'5.

GENERAL REPORT.

WASHINGTON, D. C.

1859.

THESE ARE THE RESULTS OF THE INVESTIGATION INTO THE CAUSE OF THE
FIRE WHICH BROKE OUT AT THE FACTORY OF THE
FIRM OF J. & S. CO. ON THE 15TH INSTANT. THE
FIRE WAS CAUSED BY A CANDLE WHICH HAD BEEN
LEFT BURNING IN A CHIMNEY. THE CANDLE
HAD BEEN LEFT BURNING FOR SEVERAL HOURS
AND HAD BECOME VERY HOT. IT HAD
MELTED AND HAD DROPPED INTO THE
CHIMNEY. IT HAD SET THE TIMBERWORK
ON FIRE. THE FIRE HAD SPREAD
TO THE ROOF AND HAD BURNED FOR
SEVERAL HOURS. THE FIRE HAD
DAMAGED THE FACTORY AND HAD
BURNED THE STOCKS. THE FIRE HAD
CAUSED A LOSS OF \$10,000. THE
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GENERAL REPORT

THE FIRE WHICH BROKE OUT AT THE FACTORY OF THE
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BURNED THE STOCKS. THE FIRE HAD
CAUSED A LOSS OF \$10,000.

ERRATA.

PART I.—CHAPTER I.—NARRATIVE OF 1853.

- Page 22, line 1 from top, for "*Expedition*" read "*Exploration*."
- Page 22, line 16 from bottom, after "*with*" read "*the*."
- Page 22, line 13 from bottom, after "*for*" read "*the*."
- Page 22, line 7 from bottom, for "— *Remenzi*" read "*A. Remenyi*."
- Page 22, line 6 from bottom, for "— *Moffel*" read "*Joseph F. Moffett*."
- Page 22, line 5 from bottom, for "*Theodore* ——" read "*A Jekelfaluzy*."
- Page 26, line 12 from top, for "*ten*" read "*two*."
- Page 26, line 13 from top, for "*camp of*" read "*camp by*."
- Page 26, line 17 from top, after "*season*" read "*and*."
- Page 26, line 19 from top, for "*for*" read "*in*."
- Page 26, line 19 from top, after "*guides*" read "*at that point*."
- Page 26, line 3 from bottom, and elsewhere throughout the volume, for "*Shayenne*" read "*Shyenne*."
- Page 27, line 23 from top, after "*best*" read "*thing*."
- Page 28, line 9 from bottom, for "*with*" read "*and*."
- Page 28, line 9 from bottom, omit "*and*."
- Page 30, line 3 from top, after "*hardships*" read "*and*."
- Page 30, line 1 from bottom, for "*6¹*" read "*6¹/₈*."
- Page 34, line 1 from bottom, for "*keeping back*" read "*breaking bulk*."
- Page 36, line 9 from top, for "*Yekelfoleusy*" read "*Jekelfaluzy*."
- Page 38, line 22 from bottom, for "*north*" read "*mouth*."
- Page 39, line 7 from top, for "*what*" read "*that which*."
- Page 39, line 5 from bottom, for "*and*" read "*the*."
- Page 39, line 4 from bottom, for "*trail*" read "*bad*."
- Page 41, line 11 from bottom, for "*on*" read "*over*."
- Page 41, line 4 from bottom, for "*were*" read "*not*."
- Page 42, line 8 from top, after "*half*" read "*miles*."
- Page 42, line 10 from top, for "*on*" read "*over*."
- Page 42, line 19 from bottom, } for "*Cavilier*" read "*Cavilaer*."
- Page 42, line 20 from bottom, }
- Page 44, line 18 from top, for "*Beaubien*" read "*Boulieau*."
- Page 46, line 4 from bottom, for "*Boillieaus*" read "*Boulieaus*."
- Page 47, line 22 from top, for "*21*" read "*11*."
- Page 49, line 3 from bottom, after "*and*" read "*the*."
- Page 59, line 14 from bottom, for "*cypsina*" read "*typsina*."
- Page 60, line 8 from bottom, for "*Crane*" read "*Brave*."
- Page 64, line 18 from bottom, for "*Grisly*" read "*Grizzly*."
- Page 65, line 15 from bottom, for "*saywers*" read "*sawyers*."
- Page 70, line 19 from bottom, for the blank read "*2³/₄*."

- Page 75, line 21 from top, for the blank read "15."
- Page 83, line 15 from top, after "at" read "the."
- Page 83, line 15 from top, for "Rannis" read "the Coulees."
- Page 83, line 15 from top, after "into" read "the."
- Page 86, line 13 from top, for "Kootenay" read "Koutenay."
- Page 90, line 3 from top, for "when" read "where."
- Page 91, line 13 from top, omit the first "his."
- Page 95, line 5 from top, after "between" read "the."
- Page 96, line 3 from bottom, for "children and" read "the."
- Page 102, line 8 from top, }
 Page 102, line 10 from top, } for "Cadot's" read "Cadotte's."
- Page 102, line 12 from top, omit "to."
- Page 105, line 16 from bottom, for "This" read "His."
- Page 111, line 2 from bottom, after "directions;" read "they."
- Page 112, line 21 from bottom, after "at" read "to."
- Page 112, line 6 from bottom, before "Charles" read "Brothers."
- Page 113, line 2 from top, for "Avala" read "Avali."
- Page 114, line 4 from top, before "probably" read "and."
- Page 116, line 4 from bottom, after "regaled" read "ourselves."
- Page 117, line 4 from top, for "outfit" read "he."
- Page 119, line 19 from bottom, for "sumit" read "summit."
- Page 119, line 8 from bottom, and elsewhere throughout the volume, for "Skannish" read "S'kamish."
- Page 120, line 7 from bottom, for "lakes in" read "lakes is."
- Page 120, line 7 from bottom, omit "was."
- Page 121, line 16 from top, for "Athnam" read "Atahnam."
- Page 125, line 2 from bottom, omit "he."
- Page 126, line 22 from top, and elsewhere throughout the volume, for "Snoqualme" read "Sno-qual-moo."
- Page 126, line 13 from bottom, after "us" read "too."
- Page 127, line 21 from bottom, for "latter" read "letter."
- Page 128, line 11 from bottom, and elsewhere throughout the volume, for "Quo-qual-nido" read "Sno-qual-moo."
- Page 129, line 22 from top, for "Se-cule-sel-qua" read "Se-cule-eel-qua."
- Page 129, line 5 from bottom, for "crag fish" read "cray fish."
- Page 130, line 16 from top, for "Marshall" read "Michel."
- Page 130, line 22 from top, and elsewhere throughout the volume, for "En-cha-rac-nae" read "En-cha-rae-nae."
- Page 131, line 4 from top, for "in" read "from."
- Page 134, line 6 from bottom, for "me" read "Captain McClellan."
- Page 135, line 19 from top, for "with" read "into."
- Page 135, line 14 from bottom, for "fishing" read "fishery."
- Page 135, line 7 from bottom, for "Majors" read "Messrs."
- Page 136, line 20 from top, for "Cathlamet" read "Kathlamet."
- Page 137, line 3 from top, for "Kamish" read "Samish."
- Page 137, line 23 from top, omit "to."
- Page 138, line 16 from top, for "Schan-ate-koo" read "Soi-net-kwu."
- Page 140, line 23 from top, for "this" read "the church."
- Page 142, line 3 from top, for "Stoluckwhamish" read "Steiloghaumish."
- Page 142, line 26 from bottom, for the blank read "1164."
- Page 142, line 25 from bottom, for the blank read "300."

- Page 142, line 20 from bottom, for "westwardly" read "northwardly."
- Page 144, line 8 from top, after "impossible" read "for the animals."
- Page 144, line 8 from bottom, for "Layswai" read "Lapwai."
- Page 145, line 5 from top, for "Kle-al-um" read "Kle-allum."
- Page 146, line 12 from top, for the blank read "over 990."
- Page 148, line 1 from top, omit "that" and the second "and."
- Page 148, line 2 from top, for "from" read "found."
- Page 148, line 19 from top, for "forty" read "forty-five."
- Page 148, line 12 from bottom, for "sa" read "as."
- Page 149, line 10 from top, after "unlike" read "swelling."
- Page 149, line 5 from bottom, after "had" read "travelled seven hundred miles."
- Page 149, line 5 from bottom, for "our" read "four."
- Page 150, line 4 from top, for "Charles" read "Clark's."
- Page 150, line 6 from bottom, omit "and the interval between."
- Page 153, line 22 from top, for "when" read "where."
- Page 153, line 5 from bottom, for "never has" read "would have."
- Page 154, line 5 from bottom, for "at" read "to."
- Page 155, line 6 from top, after "desideratum" read "Two views are given illustrating this trip—one of the Bear's Teeth, a prominent landmark, near where the Missouri issues from what Lewis & Clarke denominate the Gate of the Mountains, and the other of the Rocky mountains from the Marias Pass to the pass pursued by Lieut. Mullan."
- Page 157, line 6 from top, for "The" read "This."
- Page 157, line 6 from top, and elsewhere throughout the volume, for "Lo-Lo" read "Lou-Lou."
- Page 160, line 18 from bottom, for "river" read "view."
- Page 162, line 2 from top, for "from" read "forms."
- Page 162, line 20 from top, after "hills" read "This is the true Marias Pass described by the Little Dog to me at Fort Benton in September, 1853, and formerly used by the Indians in crossing the mountains."
- Page 162, line 2 from bottom, for "Mo-ko-un" read "Mo-ka-un."
- Page 164, line 4 from top, for "Ants" read "Mountains."
- Page 164, line 9 from top, for "pebly" read "pebbly."
- Page 164, line 13 from top, omit "as."
- Page 164, line 17 from bottom, after "were" read "placed."
- Page 164, line 11 from bottom, for "all" read "every."
- Page 164, line 9 from bottom, for "whole" read "amount."
- Page 165, line 3 from top, for "on" read "of."
- Page 165, line 10 from top, after "practicable" read "and feasible."
- Page 165, line 11 from top, for "in replacing" read "to replace."
- Page 165, line 17 from top, after "Cascades" read "except those of the Cowlitz and Chehalis rivers, and thence to the mouth of the Columbia."
- Page 166, line 19 from top, for "Hoosac" read "Hoosack."
- Page 167, line 8 from top, for "For" read "In."
- Page 167, line 9 from top, for "this" read "the Nachess."
- Page 167, line 25 from bottom, for "forming" read "forms."
- Page 170, line 13 from top of table, omit "(6. m. wet.)"
- Page 170, line 17 from top of table, after "off" read "from"
- Page 171, line 1 from top, for "Tlickontat" read "Klikitat."

PART I.—CHAPTER II.—NARRATIVE OF 1855

- Page 173, line 15 from bottom, for "*a Pat-tah-haha*" read "*the Pa-ta-haha*."
 Page 174, line 6 from top, for "*in cultivation*" read "*under cultivation*."
 Page 175, line 5 from bottom, for "*we*" read "*was*."
 Page 176, line 3 from top, for "*Lasswai*" read "*Lapwai*."
 Page 176, line 8 from bottom, } for "*Slyotze*" read "*Slyotze*."
 Page 176, line 5 from bottom, }
 Page 176, line 2 from bottom, for "*cuts*" read "*Guts*."
 Page 177, line 1 from bottom, for "*Mac Tarish*" read "*Mac Tavish*."
 Page 180, line 2 from top, for "*assistant*" read "*sustaining*."
 Page 184, line 10 from top, for "*arrivals*" read "*animals*."
 Page 184, line 14 from top, for "*fifteen hundred*" read "*two thousand*."
 Page 185, line 16 from top, after "*heavier*" read "*earth*."
 Page 186, line 2 from top, after "*and*" read "*the*."
 Page 194, line 2 from bottom, for "*incident*" read "*occurred*."
 Page 195, line 8 from top, for "*cme*" read "*came*."
 Page 196, line 13 from bottom, for "*Cerican*" read "*Coriacan*."
 Page 197, line 16 from bottom, for "*Creeks*" read "*Houses*."
 Page 198, line 8 from top, for "*Riser*" read "*Kizer*."
 Page 198, line 12 from bottom, for "*Craconder*" read "*Cracon du*."
 Page 199, line 15 from top, for "*Trail*" read "*Tail*."
 Page 200, line 13 from bottom, for "*d'Aélne*" read "*d'Aléne*."
 Page 201, line 15 from top, for "*Polakin*" read "*Polatkin*."
 Page 202, line 5 from bottom, after "*in*" read "*the*."

PART I.—CHAPTER III.—GEOGRAPHICAL MEMOIR.

- Page 203, line 7 from bottom, for the blank read "360."
 Page 204, line 6 from top, for "*innavigable*" read "*unnavigable*."
 Page 206, line 17 from top, for the blank read "200."
 Page 208, line 6 from top, for the blank read "*East*."
 Page 208, line 19 from bottom, after "*Rivière*" read "*à*."
 Page 208, line 3 from bottom, for "*raised*" read "*measured*."
 Page 212, line 4 from bottom, after "*say*" read "*from*."
 Page 213, line 13 from bottom, for "*it, milk*" read "*the milk*."
 Page 216, line 23 from bottom, for "*Trail*" read "*Tail*."
 Page 218, line 21 from bottom, for "*as*" read "*so*."
 Page 224, line 2 from bottom, after "*Regis*" read "*de*."
 Page 228, line 4 from top, for the blank read "*sixty*."
 Page 229, line 13 from bottom, for "*Tukanos*" read "*Tu-ka-non*."
 Page 230, line 8 from bottom, and elsewhere throughout the volume, for "*De Sme*" read "*De Smet*."
 Page 231, line 16 from top, for "*Pisko*" read "*Pisquouse*."
 Page 231, line 16 from top, for "*Wenatchapam*" read "*Wenatshapam*."
 Page 231, line 9 from bottom, for "*Entealkuese*" read "*En-te-at-kwu*."
 Page 232, line 7 from top, for "*Ne-hor-al-pit-kwa*" read "*Ne-hoi-al-pit-quu*."
 Page 232, line 14 from top, and elsewhere throughout the volume, for "*Klikatat*" read "*Klikitat*."
 Page 233, line 6 from top, for "*Pisko*" read "*Pisquouse*."

ERRATA.

- Page 234, line 7 from bottom, for "*Newawcum*" read "*Newaukum*."
- Page 235, line 5 from top, and elsewhere throughout the volume, for "*Steilaquamish*" read "*Steil-ghaumish*."
- Page 235, line 9 from top, after "*where*" read "*there*."
- Page 235, line 16 from top, and elsewhere throughout the volume, for "*Nahchess*" read "*Nachess*."
- Page 240, line 15 from bottom, for "*tend*" read "*trend*."
- Page 240, line 4 from bottom, for "*Martizes*" read "*Martires*."
- Page 242, line 9 from bottom, for "*Ce*" read "*De*."
- Page 244, line 12 from bottom, for "*Nitwat*" read "*Nitinat*."
- Page 245, line 17 from bottom, for "*V. E.*" read "*&c.*"
- Page 246, line 11 from top, for "*Niterial*" read "*Nitinat*."
- Page 247, line 8 from top, before "*is*" read "*it*."
- Page 247, line 14 from bottom, for "*Elsia*" read "*Elisa*."
- Page 249, line 16 from bottom, for "*Estevan*" read "*Esteran*."
- Page 251, line 16 from top, for "*Dungennes*" read "*Dungeness*."
- Page 252, line 10 from top, for "*Quinacasnol*" read "*Quinacarnot*."
- Page 252, line 9 from bottom, for "*Kashn*" read "*Kashu*."
- Page 253, line 3 from top, for "*Isfnal*" read "*Isfnat*."
- Page 253, line 7 from top, for "*Causto*" read "*Ceusto*."
- Page 253, line 13 from top, for "*Wcunas*" read "*Ucunas*."
- Page 255, line 9 from top, for "*Chlayarnal*" read "*Chlayarnat*."
- Page 255, line 17 from bottom, for "*Chuchanucah*" read "*Chachanucah*."
- Page 255, line 1 from bottom of notes, after "*report*" read "*&c.*"
- Page 256, line 6 from top, for "*Varhon*" read "*Vashon*."
- Page 257, line 13 from top, for "*Fidalga*" read "*Fidalgo*."
- Page 257, line 13 from top, for "*Flora*" read "*Flon*."
- Page 260, line 8 from top, for "*Yakutska*" read "*Takutska*."
- Page 260, line 8 from bottom, for "*Usclesi*" read "*Useless*."
- Page 261, line 20 from top, for "*Seatille*" read "*Seattle*."
- Page 262, line 6 from bottom, for "*Blakey*" read "*Blakely*."
- Page 264, line 15 from top, for "*Duntzte*" read "*Duntze*."
- Page 265, line 2 from top, for "*Olympia*" read "*Olympia*."
- Page 266, line 25 from bottom, for "*Satchets*" read "*Sachets*."
- Page 272, line 11 from bottom, after "*by*" read "*the*."
- Page 272, line 5 from bottom, for "*Garden*" read "*Gordon*."
- Page 276, line 6 from top, for "*Guemus*" read "*Guemes*."
- Page 276, line 10 from top, for "*Aguago*" read "*Aguayo*."
- Page 276, line 14 from top, for "*Vite*" read "*Viti*."
- Page 276, line 2 from bottom of notes, for "*Anegadigon*" read "*Anegadizon*."
- Page 277, line 1 from top, for "*Sotami*" read "*Solane*."
- Page 277, line 18 from top, for "*Pachea*" read "*Pacheco*."
- Page 277, line 19 from top, for "*Aguago*" read "*Aguayo*."
- Page 278, line 4 from bottom, for "*Greenhow*" read "*Greenough*."
- Page 279, line 19 from top, and elsewhere throughout the volume, for "*Frazer*" read "*Fraser*."
- Page 280, line 8 from top, omit "*Span*."
- Page 281, line 4 from top, after "*reached*" read "*it*."

PART I.—CHAPTER IV.—METEOROLOGY.

NOTE.—The first fourteen pages were intended to have come after the others, but were transposed in the arrangement of the manuscript for the press. This will explain the omission of certain figures, and the reference to "*preceding*" pages, which must be understood to mean *following*. The "GENERAL CONCLUSIONS" on page 14 particularly should be read after the rest of the chapter. Temperatures are in degrees of Fahrenheit, and the measurements of rain in inches; fractions are usually decimal. In some instances the temperature given for winter, &c., differs from that of the U. S. A. Met. Reg., because the mean of the three winter months is here estimated for instead of January, February, and March, as in that work.

- Page 282, line 12 from top, for "46°" read "40°."
- Page 282, line 10 from bottom, after "850" read "*feet.*"
- Page 282, line 4 from bottom, for "2,790" read "2,730."
- Page 283, line 16 from top, for "3.25" read "3° 35'."
- Page 283, line 18 from top, for situation of Fort Pierre see page 303, line 9.
- Page 283, line 24 from top, for the blank read "*about 94° 47'.*"
- Page 283, line 35 from top, and elsewhere throughout the volume, for "*Taurido*" and "*Tauride.*"
- Page 283, line 38 from top, after "*sea*" read "*to.*"
- Page 284, line 6 from top, for "*Tagaurog*" read "*Taganrog.*"
- Page 284, line 11 from top, for "*Kasau*" read "*Kasan.*"
- Page 284, line 36 from top, for "*Wosonige*" read "*Woroneje.*"
- Page 284, line 36 from top, for "*Tanubow*" read "*Tambow.*"
- Page 284, line 40 from top, for "*Kanhaw*" read "*Kouban.*"
- Page 285, line 10 from top, the original numbers are "11.6, 5.9, 4.2, 2.8, 1.7, 1.7, 0.8, 0.8."
- Page 285, line 11 from top, for " $\frac{8}{100}$ " read " $\frac{8}{1000}$."
- Page 285, line 15 from bottom, for "*amonsgt*" read "*amongst.*"
- Page 286, line 5 from bottom, for "*Kusok*" read "*Koursk.*"
- Page 288, line 2 from top, for "*Khessonallow*" read "*Kherson alone.*"
- Page 289, line 4 from top, for "*Ashlewood*" read "*Ashleaved.*"
- Page 290, line 13 from top, and elsewhere throughout the volume, for "*Laperai*" read "*Lapwai.*"
- Page 290, line 16 from top, for "600" read "1,396."
- Page 290, line 17 from top, for "55° 15'" read "53° 15'."
- Page 291, line 15 from top, for "1° 20' and 1° 24'" read "—1° 20' and —1° 24'," and omit the sign of minutes (') after fractions of degrees of temperature here and elsewhere.
- Page 292, above the table, "*Bitter Root Valley, means of two years*" belongs to first line in table.
- Page 292, line 4 from bottom of table, for "27.1" read "37.1."
- Page 292, line 16 from bottom of table, for "*then*" read "*there.*"
- Page 293, line 11 from bottom, "*as has been here shown*" refers to p. 313.
- Page 293, line 17 from bottom, "*Vol. I,*" i. e. of P. R. R. Reports.
- Page 294, "GENERAL CONCLUSIONS" should have come at the end of the chapter.
- Page 295, line 7 from top of table, for "16.10" read "16.07."
- Page 295, line 15 from top of table, for "35.30" read "32.07," and for "32.10" read "32.66." (The latter figures are those given by Blodgett in the U. S. A. Met. Reg.)
- Page 295, line 7 from bottom, for " $4^{\circ} \frac{20}{100}$ " read " $4^{\circ} \frac{20}{1000}$."
- Page 296, in the first table all the figures of 1st column are "—" (below zero); in the second table, 2d column, lines 5, 8, 11, 14, 15, "*none*" is to be understood; 3d column, line 11, for "53°" read "53 *days.*"
- Page 298, between tables, "†*Same days as at Montreal*" was intended for copyist, who should have arranged the table accordingly.

Page 298, in both tables the figures in 5th column are probably all about $3^{\circ} 20'$ too high.

Page 299, line 3 from bottom of 1st table, for "2.900" read "2.700."

Page 299, line 3 from bottom of 1st table, for "3.500" read "3.300."

Page 299, 2d table, the figures are all "—" (below zero.)

Page 299, 2d table, for "N.ENW." read "NE.NW."

Page 300, line 2 from top, for "blows" read "blew."

Page 300, line 15 from top, after "that" read "of."

Page 300, line 16 from top, for "1852" read "1853."

Page 300, line 19 from top, for "February" read "January."

Page 300, line 28 from top, for "two-fifths" read " $\frac{2}{5}$."

Page 300, line 32 from top, for "+" read "X."

Page 301, line 7 from top, for "rarefication" read "rarefaction."

Page 302, line 5 from top, for "the less" read "that less."

Page 303, near middle, for "1822-'23" read "1832-'33."

Page 304, line 8 from top, after "influence of" read "this."

Page 304, line 10 from top, omit "both."

Page 304, line 24 from top, for "by" read "from."

Page 304, 1st table, column 4, for "2,900" read "2,730."

Page 304, 2d table, column 4, for "3,420" read "3,412."

Page 304, 2d table, column 10, for "27.06" read "27°.6."

Page 305, line 9 from bottom, omit the period.

Page 306, line 2 from top, for "13th" read "14th."

Page 306, column 3 in table, for " $53^{\circ} 43'$ " read " $52^{\circ} 43'$."

Page 306, column 3 in table, for " $84^{\circ} 33'$ " read " $84^{\circ} 43'$."

Page 306, column 4 in table, for "1,600" read "1,876."

Page 306, column 4 in table, for "2,652" read "2,730."

Page 306, column 4 in table, opposite Walla-Walla, for "600?" read "1,396."

Page 306, column 5 in table, for "12-12" read " $1\frac{1}{2}$."

Page 306, column 8 in table, for " $42^{\circ} 8'$ " read " $43^{\circ} 8'$."

PART I.—CHAPTER V.—RAILROAD REPORT AND ESTIMATE.

Page 307, line 8 from bottom, for "on" read "in."

Page 308, line 15 from top, after "distance is" read "426.7."

Page 309, line 7 from top, for "Cheyenne" read "Shyenne."

Page 311, lines 5 and 6 from top, for "Craquon" read "Cracon."

Page 312, line 4 from bottom, omit "and ten" and "of."

Page 312, line 2 from bottom, omit "and four hundred and fifty-five and nine-tenths."

Page 312, line 1 from bottom, for "forty-six and four-tenths" read "4.64."

Page 313, line 1 from top, for "fifty-eight and one-tenth" read "5.35."

Page 313, line 2 from top, for "five-tenths" read "nine-tenths."

Page 313, line 19 from bottom, for the blank read " $4\frac{3}{4}$."

Page 314, line 2 from bottom, omit "probably."

Page 315, line 14 from bottom, after "to" omit "the."

Page 316, line 10 from top, for "the" read "this."

Page 318, line 17 from top, for "3,877.1" read "3,877.7."

Page 318, line 20 from top, for "2,298" read "2,290.8."

Page 318, line 9 from bottom, after "8....do" read "1.17."

Page 318, line 8 from bottom, after "11....do" read "3.6."

Page 319, line 5 from top, after "heavy" read "growth of."

- Page 319, line 23 from bottom, for "183 $\frac{3}{4}$ " read "181 $\frac{3}{4}$."
 Page 319, line 1 from bottom, for "3 $\frac{3}{8}$ " read "6 $\frac{3}{8}$."
 Page 320, line 15 from top, for "Morree" read "Mowee."
 Page 320, line 21 from top, for "Ketchelus" read "Kitchelus"
 Page 321, line 15 from bottom, for "Townshend" read "Townsend."
 Page 321, line 14 from bottom, after "Passage" commence a new paragraph, leaving out "a."
 Page 321, line 6 from bottom, after "not" read "only."
 Page 322, line 33 from top, after "tunnels" read "The distance to Seattle by the no tunnel route will be 2,092 miles."
 Page 322, line 1 from bottom, after "of" read "5,161.52."
 Page 323, line 10 from top, after "Pass" read "1,957.14."
 Page 323, line 11 from top, after "Pass" read "1,859.69."
 Page 323, line 12 from top, for "uncultivated" read "uncultivable."
 Page 323, line 14 from bottom, for the blank read "27."

PART I.—APPENDIX A.—HEIGHTS AND DISTANCES.

- Page 3, column 2, for "Fouchet" read "Touchet."
 Page 3, column 2, for "Nidl-hudlk" read "Nidl-hwdlk."
 Page 6, column 4, for "10 $\frac{1}{2}$ a. m." read "10 $\frac{1}{3}$ a. m."
 Page 6, column 4, for "1.5 p. m." read "1 $\frac{1}{2}$ p. m."
 Page 6, column 4, for "8 $\frac{1}{2}$ a. m." read "8 $\frac{1}{2}$ a. m."
 Page 7, columns 2 and 11, for "Craquon" read "Cracon."
 Page 11, column 8, for "+16.2" read "+16 $\frac{1}{5}$."

PART II.—BOTANICAL REPORT.

- Page 10, line 8 from bottom, for "a" read "so."
 Page 11, line 15 from top, for "eastern" read "western."
 Page 18, line 20 from top, after "perhaps" read "these prairies."
 Page 18, line 15 from bottom, for "leaves" read "bases."
 Page 19, line 20 from bottom, after "produced" read "by."
 Page 26, line 18 from top, for "saguinea" read "sanguinea."
 Page 26, line 21 from top, for "Corylas" read "Corylus."
 Page 26, line 25 from top, for "Spisea" read "Spiraea."
 Page 26, line 8 from bottom, for "Oropehila" read "Oreophila."
 • Page 27, line 19 from top, for "Azalea" read "Aralia."
 Page 27, line 1 from bottom, for "seed" read "red."
 Page 28, line 18 from bottom, for "as" read "or."
 Page 28, line 4 from bottom, for "Hyetal" read "Hyetal."
 Page 29, line 1 from top, for "50" read "45."—(See Part I, Chap. IV, p. 293.)
 Page 30, line 6 from top, for "7" read "27."
 Page 32, line 8 from top, for "the" read "Shoalwater," (always meant by "the bay.")
 Page 34, line 3 from top, for "Phalacrocorax" read "Graculus."—(See Part III, p. 267.)
 Page 34, line 8 from top, for "Cultellus" read "Machaera."—(See Part III, p. 385.)
 Page 39, line 21 from bottom, for "Menzelia" read "Mentzelia."
 Page 41, line 9 from bottom, for "Anoplavthus" read "Anoplanthus."
 Page 41, line 8 from bottom, for "Tourn" read "Tourn."
 Page 50, lines 7 and 9 from top, for "carnosa" read "comosa."
 Page 50, "Anoplanthus uniflorus," though the specimens are only one-flowered, yet they agree in color with *A. fasciculata*, and are probably a variety of that species, (*Orobanche fasciculata*, Nutt.)

- Page 52, line 20 from top, for "*B. Bix*" read "*R. Br.*"
 Page 52, line 21 from top, for "*Seey's*" read "*Selys.*"
 Page 52, line 26 from top, for "*Oeigospërma*" read "*Oligospërma.*"
 Page 53, line 15 from bottom, after "*ACER*" omit the period.
 Page 54, line 11 from bottom, for "*M*" read "*MELILOTUS*"
 Page 62, line 10 from top, for "*rich*" read "*March.*"
 Page 65, lines 6 and 7 from bottom, "*S. decipiens*" is a distinct species, and should have come in with a separate paragraph.

PART III.—No. 2.—REPORT UPON THE MAMMALS.—(Page 73.)

- Page 74, line 22 from bottom, for "*glassy*" read "*glossy.*"
 Page 76, line 20 from top, for "*CALIFORNIA*" read "*CALIFORNICA.*"
 Page 78, line 9 from bottom, for "*HORIBILIS*" read "*HORRIBILIS.*"
 Page 102, near middle, for "*Oregon mole*" read "*Oregon mouse.*"
 Page 116, line 20 from top, for "*MEPHITES*" read "*MEPHITIS.*"

No. 3.—REPORT UPON THE BIRDS.—(Page 140.)

- Page 143, line 9 from bottom, for "*Cal.*" read "*Cab.*"
 Page 145, line 4 from bottom, insert: "*Female.* Length, 18 to 20 inches; wing, 10 to 11; tail, 8.50.
Male. Length, 16 to 18; wing, 9.50 to 10; tail, 8 inches."
 Page 159, at top, insert: "ORDER II.—SCANSORES.—CLIMBING BIRDS."
 Page 160, line 17 from bottom, for "*SPHYROPICUS*" read "*SPHYRAPICUS.*"
 Page 160, line 4 from bottom, omit "*in*" after "*iris.*"
 Page 163, line 23 from top, for "*so*" read "*as.*"
 Page 165, line 12 from bottom, for "*then*" read "*there.*"
 Page 169, line 9 from top, for "*Denaidura*" read "*Zenaidura,*" and omit the comma after it.
 Page 170, NOTE.—The notes by Dr. Cooper (marked C.) belong to the following species:

- ? *EMPIDONAX FLAVIVENTRIS*, Baird. YELLOW-BELLIED FLYCATCHER.
 ? *TYRANNULA FLAVIVENTRIS*, WM. M. & S. F. BAIRD, Pro. Acad. Nat. Sc. Philad. I, July, 1843, 283.—IBID, Am. Journ. Sc. April, 1844.—AUD. Birds of Am. VII, 1844, 341, pl. 490.—BAIRD, Gen'l Rep't Birds, p. 198.
 ? *T. pusilla*, REINHARDT, Vidensk Meddel. 1853-'54, p. 82.—GLOGER, Caban. Journ. 1854, 426, (not Swainson?)
 ? *Empidonax hypoxanthus*, BAIRD, provisional name for eastern specimens; Gen. Rep Birds, p. 198.

EMPIDONAX DIFFICILIS, Baird, provisional name for western specimens, in same work.

For full description, see the General Report, (Vol. IX, P. R. R. Rep'ts.)

The western specimens differ so much from eastern, that Prof. Baird was induced to give them a different name *provisionally*, and when better known they may prove a distinct species. The chief differences are: colors lighter; first quill intermediate between 6th and 7th; second considerably shorter than fourth. Dr. Cooper's specimens measured:

- No. 7243. Shoalwater Bay, July 4, 1854. Length, 5.50; extent, 8.50 inches;
 No. 5920. Fort Steilacoom. Length, 5.60; extent, 8.50; wing, 2.83; tail, 2.45. Both had the iris brown; bill black above, pale flesh color below; feet black.—C.

- Page 180, line 6 from bottom, for "*last*" read "*next.*"
 Page 185, line 6 from bottom, for "*next*" read "*last.*"
 Page 190, line 12 from bottom, for "*9.75*" read "*6.75.*"

Page 195, line 23 from top, for "*atricapillus*" read "*occidentalis*."
 Page 219, line 12 from bottom, for "*rather*" read "*rarer*."
 Page 221, line 18 from top, for "*tail*" read "*true*."
 Page 238, line 8 from bottom, No. "371" is put in this species by Mr. Cassin, though 1.75 inch longer, and with a bill 0.81 longer than in the description. He also attributes *M. scolopaceus* to W. T. on the authority of Dr. Suckley, but mentions no specimen resembling it except this one.—(See Gen. Rep. Birds, p. 712.)—C.

Page 265, line 14 from bottom, insert "BAIRD and LAWRENCE, Gen. Rep. Birds, p. 868."
 Page 265, lines 1 and 2 from bottom, for "*cruta*" read "*crura*."
 Page 267, line 10 from top, for "*Carvo*" read "*Carbo*."
 Page 268, line 12 from top, for "*P. Townsendi*" read "*G. dilophus*."
 Page 286, line at bottom, read, "Length, 9.75; extent, 17.75; iris brown, bill black, feet pale flesh color, with bluish webs."
 Page 287, line 3 from top, read, "Length, 8 inches; extent, 16.25; iris grayish, bill black, feet gray with black webs."
 Page 287, line 16 from top, for " $17\frac{3}{4}$ " read "18.25."
 Page 290, line at bottom, for "*psittacauda*" read "*psittacula*."

No. 4.—REPORT UPON THE REPTILES.—(Page 292.)

Page 295, line 13 from bottom, for "*vestae*" read "*vertex*."
 Page 296, line 21 from top, for "*corcinna*" read "*concinna*."
 Page 298, line 23 from top, for "*decide*" read "*divide*."
 Page 299, line 19 from top, for "1856" read "1859."

No. 5.—REPORT UPON THE FISHES.—(Page 307.)

Page 316, in table, for "*Salmo gibber*, Suckley," read "*Salmo proteus*."—(See p. 339.)
 Page 321, line 20 from top, for "*General Report*" read "*this volume*."
 Page 323, line 18 from bottom, for "*is not probable*" read "*is probable*."
 Page 327, line 18 from top, for "*Vol. X*" read "*this volume*."
 Page 332, line 8 from bottom, for "*the Pacific R. R. Reports*" read "*this volume*."
 Page 345, line 13 from bottom, for "*F*" read "*Salmo*."

No. 6.—REPORT UPON THE MOLLUSCA.—(Page 369.)

Page 369, line 10 from top, for "*J*" read "*I*."
 Page 372, line 20 from top, for "*Pruss*" read "*Purp*."
 Page 372, line 2 from bottom, for "*specimen*" read "*species*."
 Page 373, line 3 from top, for "*punctature*" read "*punctatum*."
 Page 373, line 6 from top, for "*uniden*" read "*brevidens*."
 Page 373, lines 21 and 22 from top, for "1836" read "1856."
 Page 374, line 2 from bottom, for "*Abbaldingen*" read "*Abbildungen*."
 Page 375, line 13 from top, for "*perfection*" read "*perforation*."
 Page 376, line 5 from top, for "*synonomy*" read "*synonymy*."
 Page 376, line 6 from top, for "1857" read "1856."
 Page 379, line 9 from top, for "*Sowerby*," read "*Sowerby's*."
 Page 379, line 12, "*OSTREA EDULIS*?" Mr. Carpenter is of opinion that this is a distinct species, and on comparison with European specimens it does show differences.
 Page 380, line 4 from top, omit the words between brackets.

- Page 380, line 2 from bottom, for "S" read "L."
 Page 381, line 8 from top, for "Philad" read "Philos."
 Page 382, line 6 from bottom, for "pelatii" read "petitii."
 Page 382, line 3 from bottom, for "synomomy" read "synonymy."
 Page 383, lines 8, 7, 4, 2 from bottom, for "Camellifera" read "Lamellifera."
 Page 383, line 2 from bottom, for "none" read "worn."
 Page 383, line 11 from bottom, for "large" read "larger."
 Page 385, lines 4 and 3 from bottom, for "Sphoenia" read "Sphaenia."
 Page 385, "*Machaera Nuttallii*." This shell is correctly figured and described in "Portlock and Dixon's Voyage Round the World:" London, 1789, Plate, fig. 2 and page 354, under the name of *Solen patulus*. It must therefore be called
 MACHAERA PATULA.

NO. 7.—REPORT ON THE CRUSTACEA.—(Page 387.)

- Page 387, line 13 from top, for "inorratus" read "irroratus."
 Page 388, line 3 from top, for "Land" read "Sand."
 Page 389, line 18 from top, for "Acad" read "Soc."

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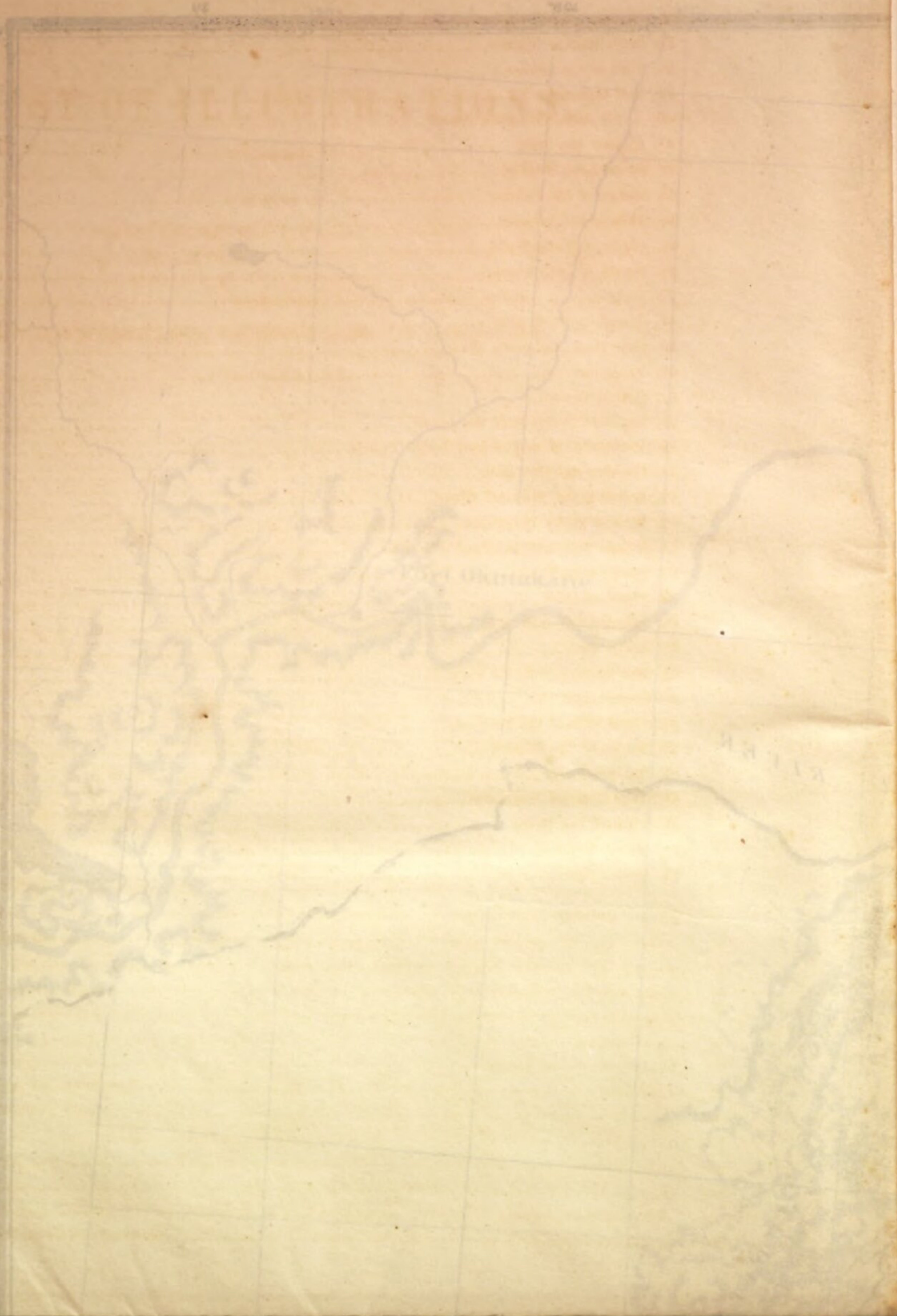
PROFILES.

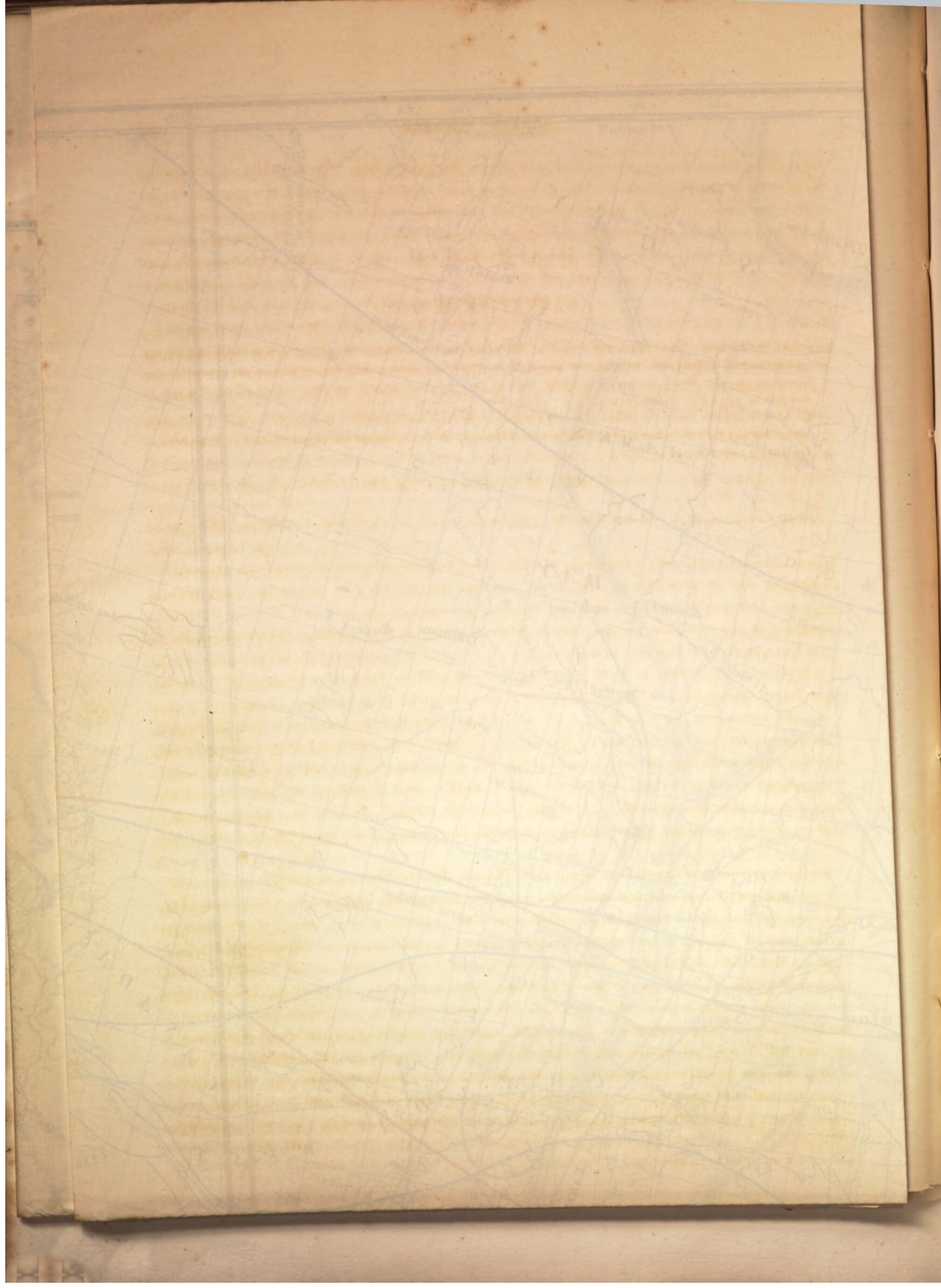
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CHAPTER I.

NARRATIVE OF 1853.

SAINT PAUL TO PIKE LAKE.—PIKE LAKE TO THE CÔTEAU DU PLATEAU DU MISSOURI.—CÔTEAU DU MISSOURI TO FORT UNION.—FORT UNION TO FORT BENTON.—FORT BENTON TO THE BITTER ROOT RIVER.—BITTER ROOT RIVER TO FORT WALLA-WALLA.—FORT WALLA-WALLA TO PUGET SOUND.—MR. GIBB'S REPORT.—LIEUTENANT ARNOLD'S REPORT.—DR. SUCKLEY'S LABORS.—CAPTAIN M'CLELLAN'S TRIP TO BELLINGHAM BAY.—MR. TINKHAM'S EXPLORATIONS FROM THE JOCKO RIVER TO SEATTLE.—LIEUTENANT MULLAN'S EXPLORATIONS SOUTH OF BLACKFOOT RIVER.—LIEUTENANT GROVER'S EXPLORATIONS FROM THE MISSOURI TO THE LOWER COLUMBIA.—LIEUTENANT MULLAN'S TRIP FROM THE BITTER ROOT TO FORT BENTON.—SUMMARY OF THE LABORS OF LIEUTENANT MULLAN AND MR. DOTTY.—LIEUTENANT ARNOLD'S LABORS.

SAINT PAUL TO PIKE LAKE.

ON the 8th of April, 1853, I was assigned to the duty of exploring a route for the Pacific railroad from St. Paul, or some eligible point on the upper Mississippi, to Puget Sound. My instructions required me to examine carefully the passes of the several mountain ranges, the geography and meteorology of the whole intermediate region, the character as avenues of trade and transportation of the Missouri and Columbia rivers, the rains and snows of the route, especially in the mountain passes, and, in short, to collect every species of information bearing upon the question of railroad practicability. It was necessary, moreover, to give great attention to the Indian tribes, as their friendship was important to be secured, and bore directly upon the questions both of the Pacific railroad and the safety of my party.

As the route was comparatively new and unexplored, it was determined to organize the whole command into two divisions. The eastern division being under my immediate direction, and the western division under Captain George B. McClellan, of the Corps of Engineers, who was ordered to report to me, and whose field of duty is best shown by the following extract from the general instructions: "A second party will proceed at once to Puget Sound and explore the passes of the Cascade range, meeting the eastern party between that range and the Rocky mountains, as may be arranged by Governor Stevens."

To this party were assigned Lieutenant J. K. Duncan, United States army, and Dr. J. G. Cooper surgeon and naturalist. Lieutenant Duncan and Dr. Cooper left New York on the 5th of May, and were instructed to repair to the Columbia river, and make every possible arrangement in the way of collecting transportation and supplies in anticipation of the arrival there of Captain McClellan, who being in Texas at the time of his assignment to the command of the western division, was necessarily late in reaching Washington city. Captain McClellan arrived the 8th of May, and, besides the charge of the western division, was, under the direction of the Secretary of War, assigned to the charge, under my general supervision, of opening the military road from Fort Steilacoom to Fort Walla-Walla. Leaving on the steamer of the 20th of May, he was joined on his way by Mr. Jos. Minter, as assistant engineer, and on his arrival on the Columbia organized his scientific corps by the addition of Lieutenant S. Mowry, United States army, as meteorologist; Mr. Geo. Gibbs, as ethnologist, geologist, and interpreter; Lieutenant H. C. Hodges, 4th infantry, was assigned to duty with him, in command of the escort and as acting quartermaster and commissary. Lieutenant Saxton was assigned to duty with the

expedition as quartermaster and commissary, and was directed to repair to the Columbia valley, organize a suitable party, and establish a depot of four thousand rations of provisions in the Bitter Root valley. He was to make the best examination of the route which his means afforded, and when the depot was established was directed to continue on his course eastward until he joined the eastern division. Fort Benton was indicated in his instructions as the point of meeting. Thus, in fact, three distinct parties were in the field: the eastern division, the western division, and the party under Lieutenant Saxton.

I relied upon Lieutenant Saxton gaining such knowledge of the country intermediate between the two divisions as would enable me to combine their labors and insure the exploration of the whole route in a single season. Much attention was given by me to the collecting of all existing information. All the books bearing upon the subject were carefully examined, and a map, on a large scale, was compiled, showing everything which had been published. A copy of this map was placed in the hands of chiefs of parties. Lieutenant Donelson was despatched to Montreal to confer with Sir George Simpson, for the purpose of gaining information in regard to the route, and to secure guides from the Red River settlement, and to get provisions and supplies from the Hudson Bay posts in case of necessity. Many instruments were to be made. The portable transit and the barometers were all constructed after the receipt of my instructions of April 8.

After considering the subject maturely, I determined to rendezvous the main party in a camp near St. Paul, and thence to start on the survey. To send a small party up the Missouri, making a survey of the river on the way up, to establish a post at Fort Union and examine the adjacent country, whilst I went in person from St. Paul. Before resolving upon this course, the question was carefully considered as to whether a steamer should not be chartered to take the main party up the Missouri to Fort Benton and *throw* it upon the mountains at once, leaving to a small party the duty of moving from St. Paul overland. A steamer which was thought suitable was found at Pittsburg, and I had the refusal of it at a very low charter. This plan was rejected, because it introduced an element of uncertainty into the operations. I could not be sure that it was suitable for the navigation of the Missouri, nor was I certain that I could take her to Fort Benton. There being no doubt whatever of the practicability of the overland route from St. Paul for the main party it was adopted, and with more readiness, as the animals required for the examination of the passes would move my party from the Mississippi to the mountains.

The eastern division was provided with the following corps of officers and civilians for scientific objects of the exploration, and for quartermaster and commissary duties: Captain J. W. T. Gardiner, 1st dragoons; Lieutenant A. J. Donelson, Corps of Engineers, with ten sappers and miners; Lieutenant Beekman Du Barry, 3d artillery; Lieutenant Cuvier Grover, 4th artillery; Lieutenant John Mullan, 2d artillery; Isaac F. Osgood, disbursing agent; J. M. Stanley, esq., artist; Dr. George Suckley, surgeon and naturalist; F. W. Lander and A. W. Tinkham, assistant engineers; John Lamber, topographer; George W. Stevens; William M. Graham, and ——— Remenzi, in charge of astronomical and magnetic observations; ——— Moffet, meteorologist; Thomas Adams, Max Strobel, Elwood Evans, F. H. Burr, and Theodore ———, aids; and T. S. Everett, quartermaster and commissary's clerk. Of whom Lieutenant Donelson, with six sappers, Lieutenant Mullan, and Mr. Graham were assigned to the duty of surveying the Missouri and establishing the depot at Fort Union, while the remainder constituted the main party to rendezvous near St. Paul.

Dr. John Evans was appointed the geologist of the exploration. Since 1851 he had been in the service of the Department of the Interior, making a geological survey of Oregon and Washington Territories, and it was believed that the public service would be best promoted by securing his co-operation with the geological portion of the exploration. He had passed over portions of the route, and, whilst preparing for the expedition he furnished me with information in regard to the general course of Milk river, of passes from the Missouri to the Bitter Root valley, of the valley itself, and of the route thence by the Lo-Lo Fork, or Traveller's Rest creek, of Lewis and Clark on their route to Fort Walla-Walla. He drew up instructions to guide in making the collections of the exploration, and was himself provided with the funds deemed, in his judgment, necessary to make the trip across the continent in connexion with the *work* of all the parties of the exploration. It seemed that thus the most ample and effective means were taken, both to make the geological results of the expedition complete and to advance the general service on which Dr. Evans was employed by the Interior Department. For, whilst the expenses and collections of his trip were on account of the exploration, he was empowered, after submitting his exploration report, to embody anything thus gained in his final geological report to the Department of the Interior.

A. W. Tinkham and F. W. Lander, engineers, were despatched, in April, to St. Paul, to examine the several crossings of the Mississippi, and to collect information generally in that region until my arrival; and Lieutenant Grover, with his clerk, T. S. Everett, was sent to St. Louis as quartermaster and commissary, in place of Lieutenant Saxton, sent to the western coast to make the necessary arrangements for supplies and transportation.

Captain Gardiner, under date of the 21st of April, was instructed to repair to St. Paul, *via* St. Louis, to hasten on the quartermaster and commissary arrangements, select the escort, establish the camp near St. Paul, and prepare the expedition for the field; and Lieutenant Du Barry, under date of April 26, was also despatched to St. Paul, with instructions to organize at that point a party of four men, push forward to Pembina, on the Red River of the North, and secure the guides to be sent there by Sir George Simpson. He was then to proceed in a west by south course, north of the Minni Wakan lake, to effect a junction with the main party moving south of that lake, the main object of his trip being to bring to the main party the desired guides in the shortest possible time. Captain Gardiner proceeded in execution of the duty assigned to him, and established the camp before my arrival; but Lieutenant Du Barry did not go to Pembina, for reasons hereafter to be mentioned.

I will here observe, that in the several instructions I enjoined the utmost economy on the parts of chiefs of parties; but care was taken to impress upon them the necessity of making such arrangements as would make the several branches of the expedition self-dependant. Whilst I had taken the necessary precaution to get supplies from the Hudson Bay posts in case of necessity, I was anxious that such necessity should not occur, and I wrote both to Governor Simpson, at Montreal, and Governor Ogden, at Vancouver, not to accumulate supplies at their several posts for the use of my parties.

The other gentlemen also followed, some to St. Louis and some to St. Paul, and by great exertion my arrangements were sufficiently matured to enable me to leave Washington on the 9th of May. I had authority from the Indian Department to hold council with Indian tribes on the route, and to make treaties with such as were not included within the limit of any existing superintendency. This applied especially to the Blackfeet, who were the only Indians on the route not included either within the northern or western superintendency.

Accompanied by Mr. Stanley, *the artist of the exploration*, I arrived at St. Louis on the 15th of May. Mr. Elwood Evans was left behind to complete the arrangements. Here I met Lieutenants Grover, Donelson, and Mullan, who had preceded me. The quartermaster arrangements were not as far advanced as I anticipated. The mules were not to be delivered at St. Paul till about the 26th of May, and the Fur Company's boat was not to start until the 20th of May. Accordingly I determined to remain in St. Louis to complete the arrangements for transportation and to provide for the establishment of a depot at the mouth of the Yellowstone.

At St. Louis, also, I secured the services of Alexander Culbertson, esq., as special agent among the Blackfeet Indians. He had resided many years among this tribe, and has had charge of the forts of the American Fur Company on the Missouri. His reputation is decidedly high as a man of character and great influence over these Indians.

On the 21st the Fur Company's boat left St. Louis, having on board the supplies intended to meet us at Fort Union, with the party under Lieutenant Donelson, already referred to, with the addition of Dr. Evans, the geologist of the exploration. Lieutenant Donelson is instructed to make the best possible survey of the Missouri that is permitted by his circumstances as a passenger on the steamboat, and to prepare a report on the capacity of the Upper Missouri for steam navigation, giving particular attention to obstructions in the river, and cost and means of removing them.

During Mr. Graham's stay in St. Louis he had the misfortune to let his chronometer run down. Dr. Evans, on reaching Fort Union, was to leave the steamer, make examination of the country southward, especially in the "Mauvaises Terres," and thence proceed on his overland journey to Oregon and Washington, meeting us at Forts Union and Benton. Special agent Culbertson was instructed to send forward an express on his arrival at Fort Union, with presents of tobacco for the Blackfeet, to advise them of the expedition about passing through their country, and to secure suitable guides and hunters to accompany us.

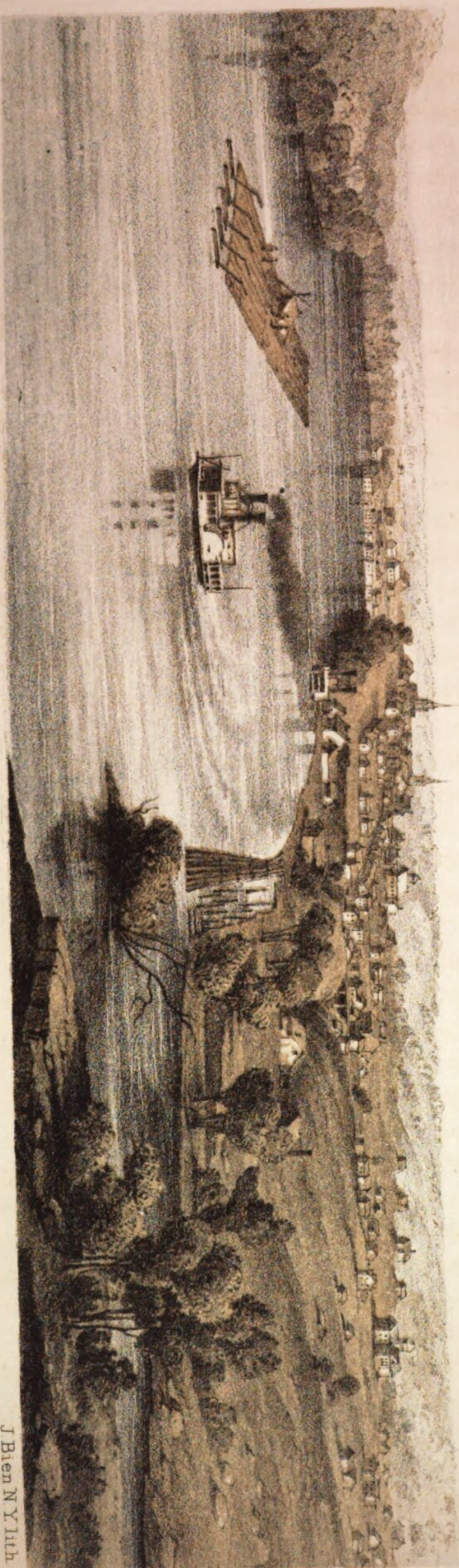
Before starting from St. Louis to go up the Mississippi I became seriously alarmed on account of the character of the mules which had been contracted for by the quartermaster for the expedition. They were sound, excellent animals, but many of them were but three or four years old, and nearly all unbroken. I had despatched Mr. Charles Taphin to St. Louis, with instructions to procure broken, serviceable animals which had made a journey across the plains, having been assured that they could be purchased without difficulty. I determined, therefore, as I went up the river, to purchase at every landing place all the serviceable broken mules that I could find, so as to insure being able to move quickly on reaching the point where my camp had been established.

I will here remark that Lieutenant Grover and Mr. Everett preceded me a few days to St. Paul.

Leaving St. Louis on the 23d of May, on my way up the Mississippi, I succeeded in purchasing at the several landings two teams of strong, well broken mules, and four horses; in some cases buying the mules from the teams on the wharves.

At Galena, where we remained the night of May 24th and 25th, I was surprised at meeting Mr. Evans, who I had supposed could not yet have finished his business in Washington. During the evening we observed the aurora borealis. At this point some animals were purchased, and a number of articles for the expedition.

Leaving Galena on the 25th, on the steamer *Nominee*, we proceeded up the river, and were enabled to make short stops at Dubuque, Prairie du Chien, Lansing, La Crosse, and other



Stanley del.

J. Bien N.Y. lith.

SAINT PAUL M. T.

places. At Holme's Landing I examined the United States dredge-boat George W. Jones, Captain Barrey. Intervals of leisure were employed in reporting fully to the War and Interior Departments my proceedings thus far, and the arrangements in contemplation for the execution of my several trusts. We arrived at St. Paul the evening of May 27.

The scenery on the Mississippi is bold, and at times beautiful, though but little variety is presented. Bluff banks on both sides, topped with trees, line its banks, and occasionally marked views occur, among which I might mention, as the most prominent, Lake Pepin, Maiden Rock, Barn Bluffs, &c.

St. Paul is beautifully located upon a high bluff on the east bank of the river, and is rapidly growing in size and importance. It is quite a business place, everything indicating vigor and activity. Among its prominent buildings are the territorial capitol, modeled after the Capitol at Washington, and several very fine churches.

Starting from St. Paul at 3½ a. m. on the 28th, I reached our camp in about an hour, and had the pleasure of rousing the gentlemen of the expedition from their sleep. Captain Gardiner had located our camp on the borders of Lake Amelia, and, in honor of the President, I called it Camp Pierce. It was situated about nine miles from St. Paul, and about three northwest from Fort Snelling. About a quarter of a mile to the eastward lay another lake or pond, connected with Lake Amelia by a creek, which was very convenient for watering our animals, and formed a fine meadow on which they grazed. These lakes furnished us with fish in abundance, consisting of bass, pickerel, and sunfish. Dr. Suckley here made a very handsome natural history collection.

The mules presented a fine appearance, and were apparently strong and healthy, though young and even more unbroken and unserviceable than I had feared. Not a single full team of broken animals could be selected, and well broken riding animals were essential, for most of the gentlemen of the scientific corps were unaccustomed to riding. I felt that time was precious and a great difficulty to be overcome, so at once resolved that the whole force should set to work to break them.

Fortunately my purchase of mules along the river enabled me to break in the animals rapidly to the teams, by which they were started several days earlier than otherwise could have been done. The grass, however, is backward, and some forage will be required on the road for a few days to come.

After a brief visit to St. Paul in the course of the day to attend to business connected with supplies and information of the country, in which connexion I desire particularly to make my acknowledgments to Captain J. H. Simpson, United States Topographical Engineers, I finally, towards night, took up my quarters at Camp Pierce. I had, however, much positive information in regard to the country, derived from the labors of Mr. Lander. In obedience to his instructions he had, previous to my arrival at St. Paul, examined the several crossings of the Mississippi, as high up as the Little Falls, and had collected information as to the general character of the country on either bank of the river. There were good locations for railroad bridges at the Falls of St. Anthony, near the mouth of Sauk river; at the mouth of the River Watab, near the mouth of Swan river; and near Little Falls. Indeed, the bridging of the Mississippi was found to be an entirely practicable undertaking, and the principal question was to select a point which would lead us on a practicable line on our general westward course, have an easy and as short a connexion as possible with Lake Superior, and be in a

region of country over which we could pass our wagons. It was not doubted that a line could be run westward from the Falls of St. Anthony, but it would be through a wooded country, where much cutting would be required for our train. By crossing at Sauk Rapids we entered at once upon the Red river trail, known to be practicable, though thus early in the season somewhat difficult for wagons. The country westward from Little Falls, at least to Long Prairie, to which point it was examined, was extremely favorable; but there was the same difficulty in moving with a train as from the Falls of St. Anthony. The object of the exploration being to determine the question of practicability, rather than the best route, and the details of locations, I determined to cross the Mississippi at Sauk Rapids, continuing for some time on the Red river trail, and then move as the information, yet to be collected, should determine.

It will be observed that, notwithstanding my delays in St. Louis, I reached St. Paul in ten days after the establishment of the camp of Captain Gardiner, and before Lieutenant Du Barry had been able to make his arrangements to proceed to Pembina, as instructed, for the guides to be sent there by Sir George Simpson. It was now obvious to me that I must abandon all idea of assistance from this quarter in order to save time absolutely indispensable to make the exploration to the Pacific the present season; that decisive and prompt measures were required to take the field at once with the whole party. I was apprehensive that there would be much delay at Pembina for the arrival of the guides, and that if we made them an element of our movement we would be detained west of the Minniewakan lake when we ought to be moving. Accordingly, I countermanded Lieutenant Du Barry's orders, and assigned him to duty in charge of the meteorological observations, and, through the kind offices of Hon. H. H. Sibley, the present governor of Minnesota, procured Mr. Dahl to proceed to Pembina, to compensate the hunters for their loss of time, and the Hudson Bay Company for the expense to which they had been put in forwarding supplies. I determined also to start off advance parties and small trains immediately, in order to infuse hope into the whole party and avail myself of the present high spirit of the camp.

Moreover, there was every reason why reconnoitering and surveying parties should be kept ahead, in order to procure timely information, both of the features of the country, which would *determine* our general course, and the special difficulties which might impede our progress; and we had the experience of the good results already obtained by pursuing this course, not only to justify but to render imperative its being persisted in.

The next two days (29th and 30th) were rainy, and were spent in camp examining into and arranging the details of organization. Lieutenant Grover was relieved, at his own request, from the duties of acting quartermaster and commissary, that he might attend to scientific duties, and Captain Gardiner was appointed to take his place. The astronomical and magnetic observations were assigned to Mr. G. W. Stevens and Captain Remenyi.

May 31.—Mr. Lander was despatched this morning, with Mr. Evelyn as assistant, and two teamsters, in charge of a wagon, drawn by mules never before in harness, to proceed northward, on the east side of the Mississippi river, to Sauk Rapids, where he was to make arrangements for crossing the main party, which would follow in a few days. From Sauk Rapids he was to continue westward, carefully reconnoitering the country as he advanced, looking to the several routes along which lines were believed to be practicable, one crossing the Shaienne river once and passing just south of Minniewakan lake, another crossing this river twice and passing some thirty miles south of the lake, and a third passing by the headwaters of the southern tribu-

taries of that river, in the general direction of Dead Colt Hillock, a prominent landmark, to the Coteau des prairies, the object being to keep all these lines in view, and not to make the final determination till all the facts bearing upon the question were ascertained; besides which, he was enjoined to make the necessary arrangements for the crossing of the several streams by the main party, and to neglect no opportunity of communicating with me as to his movements and operations. He was authorized to engage additional men and means of transportation.

The wildness of the animals which were selected may be shown by the fact that when Mr. Lander mounted the mule selected by him for his own use he was thrown with such force as to dislocate his shoulder, which required the force of three men to replace it, after which he again mounted and rode off at the head of his small party.

Mr. Tinkham and his party were fitted out this morning with a common wagon, (to be replaced by a spring wagon,) with the second mule team brought up on the Shenandoah, a good teamster, provision for fifteen days, and the necessary tents, arms, and ammunition. He was directed to follow the general course reconnoitered by Mr. Lander, collecting as much data in reference to the details of the construction as practicable, so arranging the scale that, with his present force and a few days' experience, he would be able to travel fifteen or twenty miles a day. He was to connect the astronomical and magnetic observations with his route, leaving at each camping ground some mark by which subsequent observations could be connected with his work. Careful notes were to be made of the supplies of wood, water, and grass at each camping place, and sketches taken of the country. On reaching the Sauk Rapids he was to make a rapid instrumental survey of them, and cross without waiting for the main train. Additional men were to be employed if necessary. It was suggested that his journal, with a description of the crossing of the Mississippi, would be the best as a report.

Mr. Tinkham and party moved off a little after 12 m.

June 1.—Although it rained heavily all day every one in camp was engaged in breaking mules. Mr. Stanley, who has been for several days at St. Paul on business, arrived at camp. Captain Gardiner is severely indisposed, having been unwell ever since my arrival.

June 2.—Mule breaking caused many an amusing scene. Several of the party were thrown repeatedly, but the determination they evince must overcome all obstacles; and I feel not only pleased to see their spirit, but to congratulate myself and them that no accident has occurred worthy of mention. Much hilarity was produced by the efforts of different persons, and each fall occasioned a laugh. Thus what I had seriously expected to prove a great difficulty was, in the midst of a heavy rain and gloomy weather, a source of mirthful enjoyment.

The meteorological and astronomical observations are now fully started. All the observers are diligent and interested in their duties.

June 3.—Mr. Doty started off early this morning with a train of three wagons and twenty-four pack mules. He was instructed to follow the stage road from St. Anthony to Sauk Rapids, and to cross the Mississippi at some point to be selected by me. I enjoined vigilance and the greatest care of the animals, no harsh usage of them, and the strictest economy of the stores; directing short marches, night guards, and half rations of oats for the mules, as well as personal attention to the proper management of each man and animal, giving him power to discharge men if necessary.

Early in the evening Captain Gardiner submitted an application to be relieved from duty on account of ill health, asking to be ordered to report at Washington, and enclosing a certificate from Acting Assistant Surgeon Suckley. In granting his application I expressed great regret

that the expedition should be deprived of his services and thanked him for his efforts towards its success.

In relieving Captain Gardiner, as quartermaster and commissary of the party, I did not deem it necessary to assign the escort to the special command of one of the officers of the army on duty with the expedition. The sergeant in command of the escort had, in orders, been directed to report to me in person.

June 4.—To-day I issued orders for the whole camp to be in readiness to move on Monday next, (the 6th,) so as to reach Sauk Rapids on Friday and cross the river on Saturday. The officers and gentlemen of the scientific corps will take the boat at the Falls on Monday and reach Sauk Rapids Tuesday evening, where an astronomical and magnetic station will be established.

I sent off, in charge of Mr. Simpson, a small party of wagons, the mountain howitzer, Corporal Coster and three men with twelve pack mules. A report from Mr. Lander, at Sauk Rapids, announcing his encampment on the west side of the Mississippi and giving notes of the camping ground, enabled me to furnish information to Mr. Tinkham and the teams in charge of Doty and Simpson, to regulate their marches.

One of the curiosities of our vicinity, which was sketched by Mr. Stanley, and which is shown in the accompanying sketch, (No. 2,) is the Minne-ha-ha, or the Laughing Water, called also Brown's Falls. It is situated west of the Mississippi, and distant about three miles from Fort Snelling. Ten miles above the Falls the stream flows from Lake Calhoun, and it passes through a level but fertile prairie, its margin decked with a wholesome growth of willow, poplar, and hazel, while at a short distance there are little forests of black-jack (*Quercus imbricaria*, Michaux) and other trees of like character. Here the sheet of water is from twenty to twenty-five feet wide, and its fall forty-one feet. The rock over which it pours shelters an oval cave about seventy-five feet wide and thirty feet from the falling water to the back. The view is taken from beneath this shelving rock. Though the magnitude of this cascade is not such as to excite our wonder, its picturesque beauty and pleasing melody attract the admiration of every visiter.

Below the Falls the aspect is quite different. The stream glides along in its rocky channel forty to fifty feet from the top of the steep rocky banks, for about four miles, to the Mississippi river, overshadowed, on both sides, by a forest of oak, ash, maple, and other trees, with their attendant vines and deep undergrowth. The soil above this valley is very rich, and there are good grounds for the opinion that the axe, the plough, and the mill-wheel will before long invade and materially change the character of the scene.

This stream is usually perfectly clear. So short, indeed, is its course that it seldom becomes to any degree turbid or largely increased in volume.

June 6.—Broke up camp at 10 a. m., sending forward the command in three parties; one under Lieutenant Grover, consisting of the astronomical, magnetic, and meteorological parties; and Mr. John Lambert, topographer, assisted by Mr. Strobel with the necessary men, fourteen persons in all, were sent on the steamer that plies between St. Anthony and Sauk Rapids, with directions to land on the west side of the Mississippi river, below the mouth of Sauk river, and crossing it by a good ford about a mile and a half above its mouth, establish an astronomical, magnetic, and meteorological station on the Red river trail. The directions were given to sketch in the river and make all the observations practicable for determining geographical positions and the altitude, in order to connect carefully the river with the work of the land parties; fourteen mules, two horses, and one wagon were also put on board as transportation to reach the Red river trail from the point of landing.



Stanley del

J. Bien N. Y. lith

MINNEHAHA OR BROWN'S FALLS NEAR FORT SNELLING.

The second, under Lieutenant Du Barry, consisting of Mr. Stanley, Dr. Suckley, Mr. Le Frambois, the guide, a sergeant, and fourteen men, were instructed to follow on the trail of the advance parties on the left or east bank of the Mississippi, to cross the river at Sauk Rapids and encamp with the former party. The third consisting of the train in charge of Mr. Everett, the quartermaster and commissary clerk, with the same general instructions.

I accompanied Lieutenant Du Barry's command to the ferry at St. Anthony, and then went to the point whence the steamboat Governor Ramsey started, which was to convey Lieutenant Grover's party up the Mississippi. The stores, instruments, baggage, with a quantity of oats, made four heavy wagon loads. The boat got off about half-past 2 o'clock, when I went to our old camp to make the final arrangements for the moving of the remainder of the train, and late in the evening went to St. Anthony, where I left Mr. Osgood and a light wagon to await Mr. Kendall, whose arrival from New York, with numerous instruments and two India rubber boats, was daily expected. I remained in St. Anthony till noon of June 7, to secure the services of several *voyageurs*, and particularly of the guide Pierre Boutineau and the hunter Menoc, in which I was successful; and starting about noon, and taking a rapid conveyance, I pushed forward the same day forty miles, overtaking at Rum river Lieutenant Du Barry, and some miles beyond both Doty and Simpson; and reaching Sauk Rapids, a distance of 30 miles further, by 11 a. m., found Mr. Tinkham actively engaged in the survey of that portion of the river. The crossing at St. Anthony is by a rope ferry, its motive power being the action of the current, having a short rope at the bow, and a longer or slack rope astern. On the west side of the Mississippi, about three miles above Rum river, there was a large encampment of Winnebago Indians, consisting of about one hundred lodges. These are constructed of oak bark, fastened by strips of buckskin over arched poles, resembling in shape the cover of a wagon; they are about eight feet high, and from ten to thirty feet long, according to the number of families to be accommodated. The chief's lodge, in the centre, is much larger, and distinguished by the flags upon it, two British and two American colors. The shores are lined with canoes, and the village extends an eighth of a mile along the river. The country for the first seven miles after leaving camp and striking the St. Anthony road is a wet prairie. After leaving St. Anthony the country appears to rise towards the north; the road lies on the eastern bank of the Mississippi, along the plateau, which is generally timbered with the smaller varieties of oak, in some places forming beautiful groves. The wood is, however, of little value, save for fuel. Some tamarack swamps were seen, which furnish very useful timber, while the western bank is usually a bare prairie, with occasionally scattered woods, which contain the ordinary variety of forest trees, excepting pine, which is found only at two points just above Clear Water creek. The face of the country is undulating, and abounds in small lakes, some with sandy and gravelly bottoms, but the greater number lying in the vicinity of the route are muddy, with rich vegetation on their edges and in their midst. The plateau is cut in by many small streams running into the Mississippi, the level of the water being much below the general level, and the banks are so steep as to require cutting to pass with wagons. The prevailing character of the Mississippi bottom from St. Anthony to Elk river is, immediately on the bank of the river, a low bottom; but a few feet above the level of the river, which terminates a short distance back in a slope which ascends to another plateau, from which a second slope, about 30 feet above the water's edge, brings us to the general level of the country. When the low bottom is absent the river encroaches upon the plateau, forming bluffs. The river averages in width about 300 yards.

June 8.—On the road and at Sauk's Rapids several additional men were engaged, among

them some Canadian *voyageurs*. These men, being sometimes half-breeds, speak a jargon of *patois* French, Chippewa, and other Indian dialects. They are a hardy, willing, enduring class, inured to hardships, used to encounter all sorts of difficulties in their journeys between different posts of the fur companies. They must be treated with kindness and a certain degree of familiarity, and, their confidence and affections being secured, they are the most obedient and hard-working fellows in the world. This morning I learned that Lieutenant Grover and his steamboat party had landed late last evening about five miles below Sauk river, and had there encamped. In the afternoon, accompanied by Boutineau, I crossed the Mississippi to find him, and went three miles in a drenching rain without reaching his position.

He had not succeeded in moving his camp to the Red river trail that day, in consequence of having only two wagons to transport four loads from the boat.

I despatched Henry Beaulieu in search of Lander, and he returned with the information that Lander was about eighteen miles ahead, at Cold Spring, and that he had made there a good crossing for wagons.

June 9.—I went to Mr. Lander's camp and examined the crossing, which I found to be practicable, and the work well done. Cold Spring, though only a stream of ten feet width and one foot deep, is bordered on each side by a slough full two hundred feet wide. Over this Mr. Lander had constructed a causeway of logs, filling in with willows, saplings, and mowed grass, thus forming a good wagon road across it. After dinner we rode forward to the crossing of Sauk river, which we found not at all difficult, a small party being sufficient to make it passable in few days.

Mr. Tinkham joined Mr. Lander in the course of this day, and having decided to leave the Red river trail as soon as possible, north of White Bear lake, and issued the necessary directions for the movements of their parties in the morning.

June 10.—I returned to Lieutenant Grover's camp, which was beautifully situated on the north bank of the Osakis or Sauk river, about two miles from its mouth. The grass was indifferent and backward, but, with half rations of oats, abundant for the animals; water excellent. In honor of the Secretary of War we named it Camp Davis.

Lieutenant Grover, with his party, reached Itasca at 9½ p. m. of the day he left St. Anthony, (June 6,) where the boat lay by until daybreak. About 7 p. m. of the 7th they were obliged to disembark on the west side of the river, about five miles below Sauk Rapids, on account of the low state of the water in the river channel. As it was late in the day camp was immediately pitched. The landing point was on a narrow bottom, covered with a scraggy underbrush of scrub oak, vines, &c., at the base of a bluff of some 29 feet rise, also covered with the same growth, which extended back nearly a mile, and was of such a nature that it was necessary to cut a road to the open prairie. This, together with the necessity of making two trips a day in order to push forward the stores in his charge, so delayed him that he only reached the right bank of the Sauk, near its mouth, where he encamped on the 8th in a driving rain. He crossed the Sauk the following morning at a very good ford, the only difficulty being the necessity of unloading the wagons and letting them down a very steep bank by hand. He reached Camp Davis with his party safely on the 9th of June. The topography of the route was sketched in by Mr. Lambert, and observations were made by the several observers. Lieutenant Du Barry arrived this afternoon with his party, as did the small trains of Doty and Simpson. A very severe thunder storm, with heavy rain for about five hours, occurred at night, amounting in the rain-gauge to 6 1/2 inches.

My acquaintance with the *voyageurs*, thus far, has impressed me favorably. They are thorough woodsmen, and just the men for prairie life also, going into the water as pleasantly as a spaniel, and remaining there as long as needed; stout, able-bodied, and willing to put their shoulders to the wheel whenever necessary; no slough or bog deters them.

Pierre Boutineau, engaged as our guide, I find a most useful man, to whom all the voyageurs look up with great confidence.

June 11.—A very busy day in camp. Engaged in making arrangements for pushing forward detachments next Monday. Lieutenant Grover was directed to be in readiness to take charge of an advance party. Ordered an inspection of camp, personal baggage, and property of all descriptions, by Lieutenant Du Barry.* The rear of the train, in charge of Mr. Everett, arrived within ten miles of the Rapids, and will cross to-morrow.

June 12.—Messrs. Osgood and Kendall reached camp this morning, with the barometers and India rubber boats. This mission had been performed with exemplary promptitude and success. At St. Louis I was telegraphed that many of the barometers had been broken, and they could not be supplied short of New York. They were absolutely indispensable. I sent Mr. Kendall there immediately, and in thirty days the boats and instruments were made and brought to my camp, eighty miles on our way. Mr. Everett also arrived about noon to-day, having left Camp Pierce on the 8th instant. I regretted to observe that many of his animals were in very bad condition. Of our whole number some forty were disabled, and eight or ten so much so as to give very little hope that they could do any further service. I refused, however, to sell even these to the many applicants who expressed a willingness to take them off our hands below the cost of purchase. Assembling both officers and men to-day, I caused to be read the camp regulations which I had prepared for the government of the party, and made a short address, in which I informed them that every man would be expected to look to the safety of his comrades; that all alike, whether soldier or civilian, would be expected to stand guard; and in case of difficulties to meet them promptly. I exaggerated the difficulties which lay before us, and represented that the country through which they would pass was intersected by bogs, marshes, and deep morasses; that rivers were to be forded and bridged, mountains and valleys to be crossed; that the first 180 miles of the journey was reported to be through a continuous marsh, barely practicable, where every man would have to go through mud and water, and apply his shoulders to the wheel; that in ten days we would reach the Indian country, where heavy guard duty would have to be performed to protect property and preserve lives; that still further on we would probably be compelled to force our way through the country of the Black-foot Indians, a tribe proverbially treacherous and warlike; that then the snows of the mountains would have to be overcome, and that every man would be expected to follow wherever he might be led; that no one would be sacrificed, nor would any one be subjected to any risk which I would not freely incur; and that whoever was not willing to co-operate with us had better at once retire. After these remarks the camp regulations were read by Mr. Kendall, and my views were cordially approved. I despatched Lieutenant Grover, with a picked party of some fifteen men, with instructions to reconnoitre carefully the country north and in the vicinity of White Bear lake, with a view of ascertaining the point where the expedition should leave the Red river trail, and indicating that it was desirable to run from that point north of Lake Traverse to the Dead Colt Hillock, and thence to the Yellowstone. In the execution of this duty he was directed to take general charge of the advance parties in charge of Messrs. Lander and

* See Order No. 6, vol. I., p. 46.

Tinkham, who were to assist him in reconnaissance, and at the same time collect the data in their departments of the work up to the final period of departure from the Red river trail. Beaulieu brought this afternoon despatches from Messrs. Lander and Tinkham, who are now together, twenty miles west of Sauk river, on the Red river trail, awaiting instructions, and Mr. Tinkham requested more voyageurs to assist in camp duties.

Mr. Lander, adverting to the severity of the sloughs, now full from the late rains, advises ropes and brush to be carried to assist in getting the wagons through them. This trip of Beaulieu is worthy of notice, and entitles him to credit as a persevering and trusty man. He left our camp late last Friday evening, in search of them, and being compelled to leave his horse at the crossing of Sauk river, he waded over and walked out to their camp, some twenty miles, sleeping in the prairie, and reached it before breakfast, although he lost the trail.

June 13.—Continuing the project of sending off the train in detached parties, and thus gradually breaking up the camp, much of the day was spent in preparing a party to be placed in charge of Dr. Suckley. All was effected by 4 p. m., when his party, consisting of Belland, the guide, Menoc, a hunter, a cook, Corporal Coster, and two dragoons, with two led horses and two led mules, six pack mules, two men in charge of them, Belland's riding horse, and a Pembina cart, in charge of Henry Boilleau, started for camp.

He was instructed to follow Lieutenant Grover's trail, in slow and easy marches, look carefully to his animals, and pay particular attention to the collections in natural history.

To-day I issued an order creating assimilated rank in the expedition, by which certain gentlemen of the party were appointed to the grade of lieutenant, and others to the grade of non-commissioned officer, for purposes of convenience in detailing guard. By this course the relative position of each man was fixed; and whether in the main or detached parties, it was known whose duty it was to give orders in case of necessity. Military organization is in some degree indispensable, and the idea of an escort has been entirely abandoned. All are soldiers in the performance of guard duty, and the soldiers accompanying us are on fatigue duty, and not merely to escort us by day and to stand guard at night. Several of the Pembina carts purchased of Dr. Borup arrived to-day in camp. Out of the four he sent we were able to make two pretty good ones. They are made entirely of wood, having no iron at all about them, very roughly constructed, and the wheels usually wrapped with raw hide or buffalo skin, in place of an iron tire, and to prevent their cutting through the marshy ground so extensive between here and Pembina. They are drawn by horses, oxen, or mules, one person usually driving from two to six carts, and when loaded they will carry from six to eight hundred pounds. They look as if made for only one trip, and the creaking of the wheels on their wooden axle does not give the idea of their standing much service. Their first appearance to those of the party unaccustomed to the sight, with the oxen harnessed in them, caused much merriment; and as they moved over the prairie the singular noise produced by their wheels assured us that with such an accompaniment no need existed for any musical instruments or players, for these discoursed most sweetly.

June 14.—Spent the day in making the necessary arrangements to push forward the whole camp, to be organized for the present in detached parties, under separate heads, and all under my general direction. Lieutenant Du Barry was placed in general charge of the meteorological observations. Everything now presents a favorable aspect and all will be ready to move off to-morrow morning. The wagons are being loaded, and the distribution of weight requires care and attention. Procured several more Pembina carts, as I was able to secure only one

good cart and one ox out of the four sent by Dr. Borup. Engaged to-day Paul Boilleau, a half-breed Chippewa, of collegiate education, who has filled a seat in the territorial legislature with credit, and also been long in the service of the Fur Company. In order to provide for the movement of the train and the scientific corps, which accompanied or happened to be with it, I assigned Lieutenant Du Barry, who, as already stated, had been placed in charge of the meteorological observations, to its charge as executive officer. Whilst all the reconnoitering parties and the observers, except those in special charge of Lieutenant Du Barry, received their immediate instructions from me, they were, in my absence, under his supervision, as regards discipline and police, when present with the train. The train itself was especially in charge of Mr. Osgood, and the issues of provisions were made by Sergeant Lindner of the dragoon detachment. S. P. Higgins was wagon master, and William Simpson pack master. Paul Boilleau was placed in charge of the Pembina train, so called, which, consisting at first of five carts, each drawn by an ox, was this day increased by a very superior wagon team, drawn by two yokes of very large and serviceable oxen, purchased of Captain Todd, in command of Fort Ripley. It may here be observed that the Pembina train, managed entirely by the voyageurs, invariably moved by itself, crossed all the streams without additional assistance, gave us the least trouble in supervision, and was altogether the most economical and effective transportation we had.

A pioneer wagon, containing rations for the advance party and the India rubber boats, loaded lightly, in order in case of necessity to be rapidly pushed forward to the advance parties, and a wagon of Indian goods, was with the train.

Lieutenant Du Barry, in whose instructions most of the above arrangements were specially mentioned, especially those in regard to the pioneer wagons, was directed to prepare as many of the meteorological observers for the field as possible, and make all the collections in geology, botany, and natural history in his power. I did not expect that the corps of observers, especially in the determining of altitudes, would be well prepared for their duties till they had made some hundred miles, nor that in other respects the scale of operations and the character of the work would be definitely fixed, looking always to the fact that the expedition was to reach its destination the present season. And it was fortunate that for this distance our route lay through a country generally open, and where there were no special difficulties in the way of railroad practicability.

Lieutenant Du Barry left the camp about two o'clock with the main train, and I remained behind with the observers till the next day.

The arrangements thus made left me free either to be with the advance parties or with the train, or to make personal examinations of important features of the country off the lines of the trail.

June 16.—Proceeding with the remainder of the camp, three miles from Camp Davis we passed through a belt of woods for two miles where the flies were excessively annoying, persecuting our animals so that it was hard to keep them in the road, as they constantly attempted to rush into the bushes. The country to Cold spring has a rich alluvial soil, with scattered groves of timber. It is mostly a level prairie, occasionally broken by a small stream, and excellent for agricultural purposes.

Cold spring is a stream of most beautifully limpid cold water, about ten feet wide and six or eight inches deep. The train and parties passing over it had made the crossing practicable, and our small party experienced no delay, but pushed on and overtook Lieutenant Du Barry at

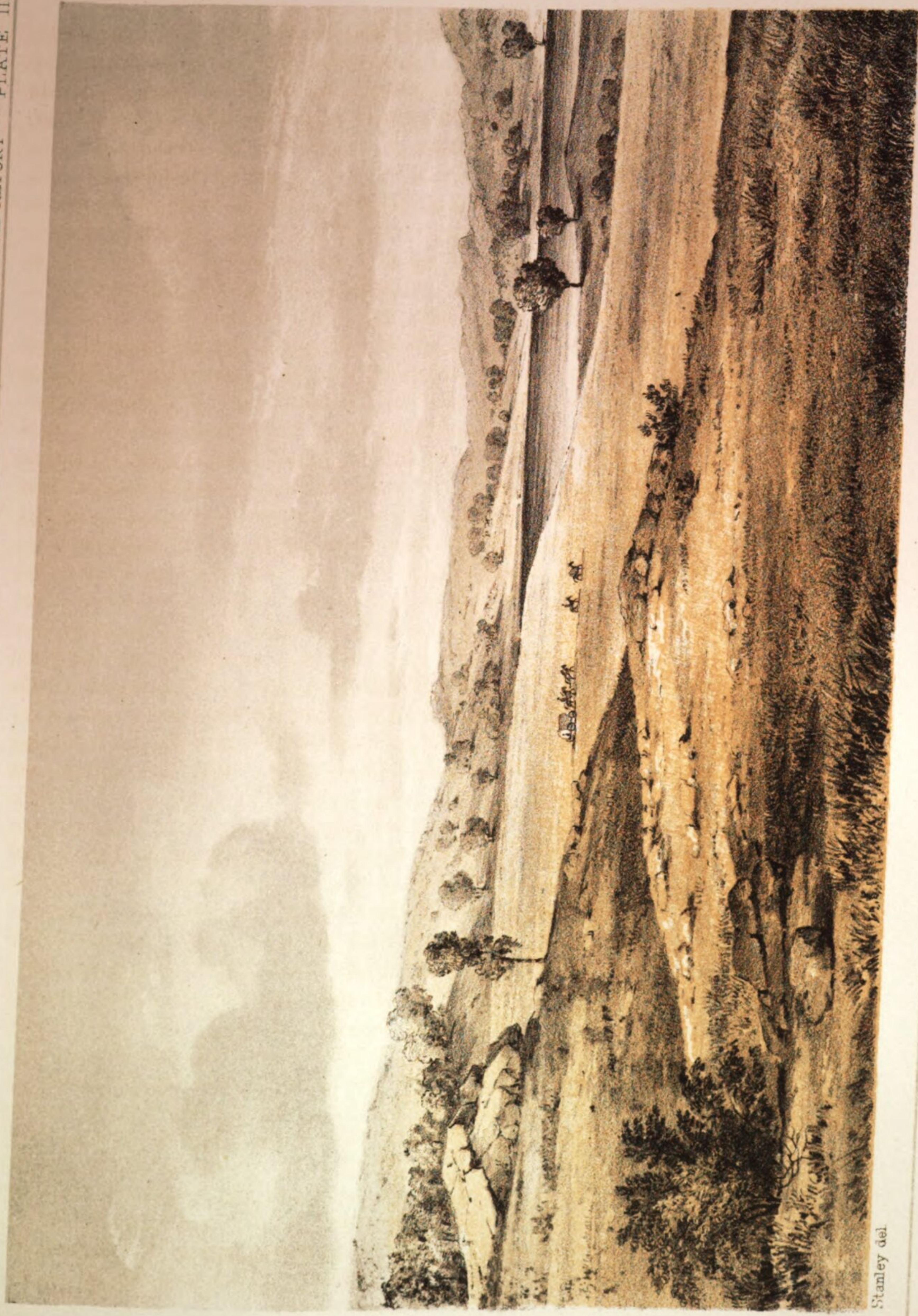
Cold stream, who, not being able to cross the Sauk to-night, encamped about four o'clock on the east side of the river. The crossing of Cold stream by the main party was effected with considerable delay and much hard work. Before coming to the boggy place, which presented the most serious obstructions, a rapid stream, about eight or ten inches deep, with steep banks, nearly two feet high, is to be crossed, on the west side of which the ground is soft, affording but little foothold for the animals. Here brush and cut grass had to be placed for a distance of some sixty yards along the bends of a very crooked stream, and there a high hill had to be ascended by the animals just after a hard pull over the soft road. Passing through Lieutenant Du Barry's camp I went on to Dr. Suckley's, on the west side of the Sauk. Sauk river at our ford is about 120 feet wide, though, owing to the obliquity of the banks and rapidity of current, the ford is near 300 feet wide and the water five feet deep.

June 17.—This morning I started with Dr. Suckley, leaving Evans and Kendall to come up with the pioneer wagon. We intended when leaving to encamp at Lake David, but Corporal Coster, who was ahead, passed it a mile or more before observing it, and we concluded to go on to Lake Henry, which was said to be eight miles beyond.

Lieutenant Du Barry effected the crossing of the train in one day, and encamped on the west side of the Sauk, six miles from Cold spring. The country throughout the day's march was a rolling prairie, interspersed with small sloughs, filled by the recent rains; the soil is rich and black; grass good, and occasionally gravelly hillocks. At a distance of one to six miles to the east is a wooded ridge, evidently lining the bank of Sauk river, and apparently from sixty to one hundred feet high.

In the crossing of the Sauk by the main train the India rubber boats were, for the first time, used. The larger one is about twelve feet long and four wide, weighing seventy-five pounds, the other about one-fifth smaller. A rope was stretched across the stream and the boats ferried across by means of a ring attached to their bows and sliding along the rope. They succeeded admirably; and a birch canoe, managed by one of the *voyageurs*, was also used in crossing. Some of the men were in the water for hours, but worked faithfully and efficiently. The distance from Sauk river to Lake Henry is nineteen and a half miles. The pioneer wagon reached within a mile of our camp, after dark, where it remained all night. I sent back Belland to inform Lieutenant Du Barry that I intended to go forward and join the advance parties to-morrow morning.

June 18.—Fullerton, one of Tinkham's party, discharged by him, brought word that he was at Lightning lake, fifteen miles ahead. Sent back Kendall, directing Osgood to come forward to Lightning lake to-morrow with two wagons, the reserve wagon loaded with ropes, spades, a boat, &c., and that containing Indian goods. Left camp about seven o'clock, and in about three-quarters of a mile crossed a bad place, requiring some grass. The water was two feet deep, and the bottom miry. Our road lay through a beautiful prairie. The shores of Lake Henry are heavily wooded. In two miles and a half further we found two very wet places, one hundred yards apart. In two miles further we came to a long marsh, where the ground was very soft and where our wagons stalled. By leaving the trail, however, and taking between two mounds an excellent wagon road may be secured. Three-quarters of a mile beyond, we encountered a very deep, muddy slough, to cross which we had recourse to a long rope, and all our force pulled on it. A branch of Crow river is then reached in a mile or little more. It is about twelve feet wide and two deep; both sides are overflown marsh, making the place very difficult to cross. To avoid keeping back we again used the long rope,



Stanley del

J Bien N. Y. lith.

SAUK RIVER.



Stanley del.

LIGHTNING LAKE.

J. Bien N. Y. lith.

and attaching three pairs of mules to it, all our men pulling on it at the same time, we got the wagon through. We arrived about noon at Crow-wing river, nine miles from camp. It was four or five feet deep and twenty feet wide where we crossed it, and at this time overflowing its usual banks. Broke bulk here, the men packing our *stuff* across. Near its west bank Evans found a fine spring, having a temperature of 52° , while the river was 66° and the air at 77° . Passing Crow river we find a continuous grove of oak trees to our left, and in five miles a series of small lakes to our right, not wooded but abounding in game. Within three miles of Lightning lake passed a large lake without name, and as Boutineau informed me that there Governor Ramsey lost his horse on the way to Pembina, we named it Ramsey lake.

Arrived at camp on Lightning lake about $8\frac{1}{2}$ p. m., the train coming up an hour after. Distance travelled, eighteen and three-quarter miles. The frequent sloughs and bad crossings in our march to-day added much to the labors of the men and animals. Found that Lieutenant Grover and the other advanced parties had moved forward to Pike lake. After the hard day's march we much enjoyed our supper of game, cooked in hunter's style on sticks before the fire, although it was midnight before we could have it ready.

June 19.—Sunday.—Lightning lake is a very beautiful sheet of water; so called from the fact that during Captain Pope's expedition, while encamped here, one of those storms so fearfully violent in this country occurred, during which one of his party was instantly killed by a stroke of lightning. Its northern shore is thickly studded with timber, and the southern side, upon which we are encamped, is more thinly wooded, but affords an ample supply for all camping purposes. The water is excellent, as is also the grass. Pickerel, pike, and bass fill the lake, numbers of which our parties caught; and ducks, geese, swan, plover, and prairie chicken, abound in the vicinity. At such a camping place we determined to spend the Sabbath and await the coming up of the wagons which I had ordered to push ahead of the train. Received, late in the evening, a note from Lieutenant Grover, announcing that Messrs. Lander and Tinkham were encamped with him near White Bear lake; that to-morrow he would move forward to Pike lake and then reconnoitre the country in advance. Everything in his camp was in good condition.

The day of rest was enjoyed by the whole party; some fishing, washing and mending their clothes, others trying various modes of cooking the game and fish, which abounded. Evans succeeded admirably in roasting a fish in the ashes, first rolling it up in brown paper dampened, which, when removed, brought off the scales with it, leaving the white meat clean and well done. Early after dinner Mr. Osgood arrived, informing me that Lieutenant Du Barry, misconstruing my instruction, had declined to allow him to bring forward the two wagons which I had ordered for the use of the advance parties, and without which there was no use in my going ahead. I determined at once to go back myself the next morning with Boutineau, Osgood, Boilleau, and a wagon, and, as it was possible we might not get further than Crow river with the train, detailed some men to cut wood and take it to that river for the use of the party. I sent Belland forward to Lieutenant Grover to inform him of the trouble and that I would join him on Tuesday night.

June 20.—Started at 3.30 a. m. to go back to the main train, which I met five miles west of Lake Henry. Taking charge of the train myself, directed Boutineau to explore in advance for the most practicable route. The bad crossing referred to in the narrative of the 18th was, by great exertion and the united force of the whole party, effected without accident, and the whole train reached Lightning lake by 4.30 p. m.

June 21.—In compliance with his own request I relieved Lieutenant Du Barry from duty with the expedition, and ordered him to report in person to the Adjutant General in Washington city. He was desired to call upon the Secretary of War and acquaint him with the whole history of the expedition up to this point; and to enable him to reach the settlements with some degree of comfort and expedition, I dispatched Mr. Kendall and two of the voyageurs to accompany him as far as Long Prairie on his return, whence there would be no difficulty in his procuring transportation to Sauk Rapids. From Long Prairie the party were to procure some supplies and Indian ponies and overtake the expedition as soon as possible.

Captain Remenyi and his assistant, Mr. Yekelfoleusy, were discharged to-day, as they did not perform their duties to my satisfaction. The baggage was weighed and each member allowed twenty-five pounds with his blankets, the excess to be turned over to the quartermaster, who would find other transportation for it. It was made the duty of each man to take out and put in the wagons his own personal baggage, and the loads were distributed accordingly.

It was here ascertained that flour was likely to be very insufficient, as some had been damaged in crossing streams on the backs of mules, and two sacks of salt had been taken by mistake for it.

All these matters detained us until 4.30 p. m., when I pushed forward with Dr. Suckley's and the scientific parties. The clouds were gathering and indicated a severe gust. We reached a beautiful lake, about three miles distant, called by us Lake Stanley, in honor of the artist of the expedition, and had just time to get into camp to save ourselves from a very severe storm, which continued with great violence till near 7 p. m.

June 22.—My party, leaving Dr. Suckley, got off about 6 a. m. The first obstruction we met in our journey to-day occurred about three and a half miles from camp, which, our guides inform us, is a branch of Crow river. It is about twenty feet wide. The approach to it is by a marsh. The water runs very swiftly, say six or seven miles an hour. Our teams got through safely by the men applying their force to the wheels; the detention was, however, slight. One more swift, narrow, but deep stream occurs before reaching White Bear lake, offering some impediment to our progress. By the application of personal force this difficulty was overcome without lightening the loads or even doubling teams. We arrived at White Bear lake, about nine and a half miles from this morning's camp, at 10 $\frac{1}{4}$ a. m.

Leaving Lightning lake the country seems to change its character and is no longer a flat, undiversified surface, with occasionally a gentle undulation scarcely attracting attention. It has gradually changed to a heavy rolling prairie which, before approaching White Bear lake, becomes broken up into hills, valleys, and basins, varying from thirty to fifty feet in depth. Boulders and stones, from the size of pebbles to paving stones, are very numerous. Our route to-day appears to be gradually ascending, at a probable rate of eight or ten feet per mile.

White Bear lake, upon or near which most of the parties of the survey are encamped, lies in sight of our trail, about two miles distant to the south. It is a beautiful sheet of water, bordered with timber, about fourteen miles long and two wide, with high, swelling banks running back a mile or so, rising to the height of about one hundred and fifty feet.

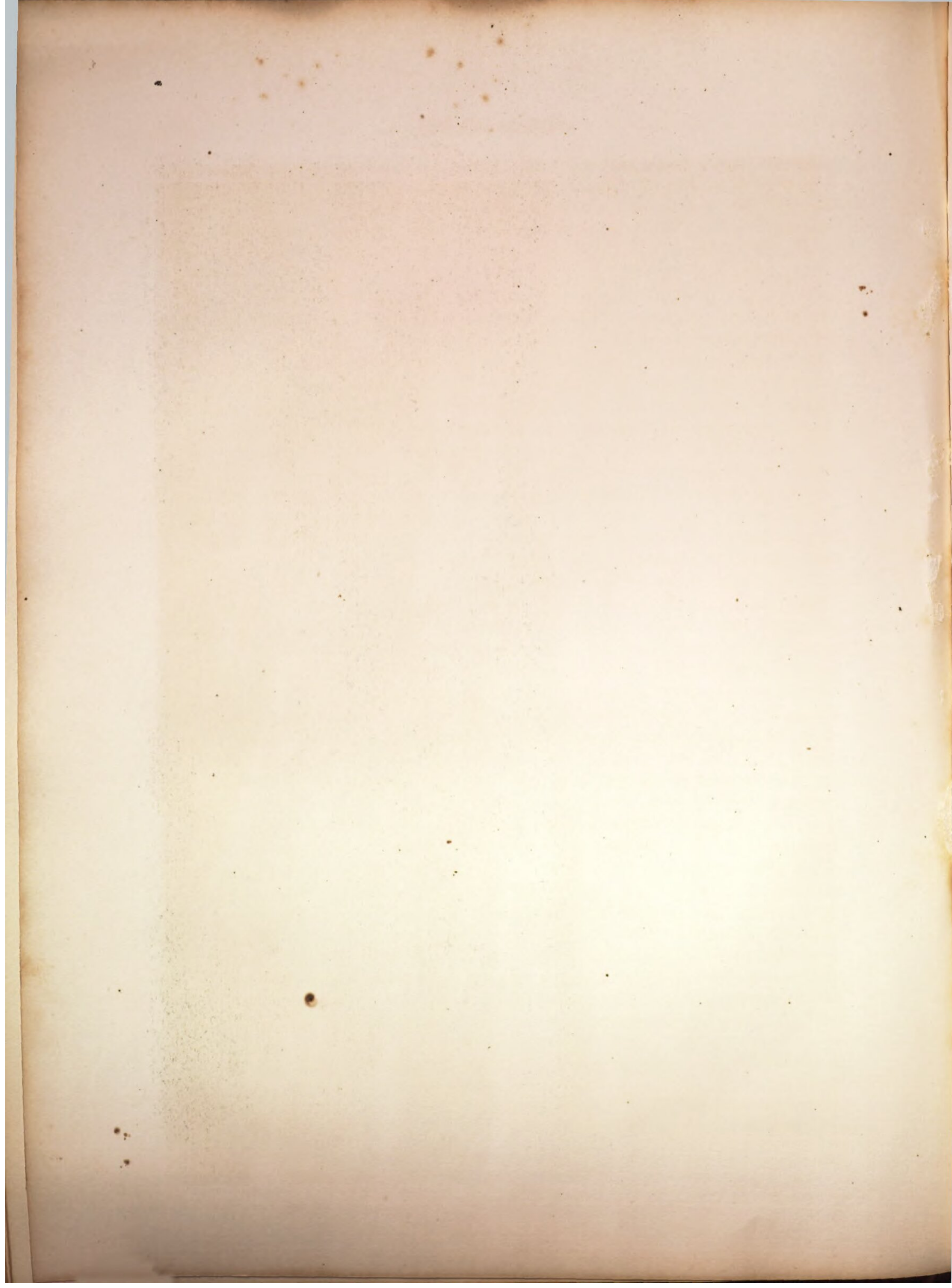
As the animals looked so fresh, and the day was cool and good for travelling, we halted only for a rest, and concluded to push forward to the next suitable point for a camping place. About five miles from the lake we came to a very heavy, severe stream, apparently running into it. The king bolt of the ambulance got broken in going through this, and occasioned consid-

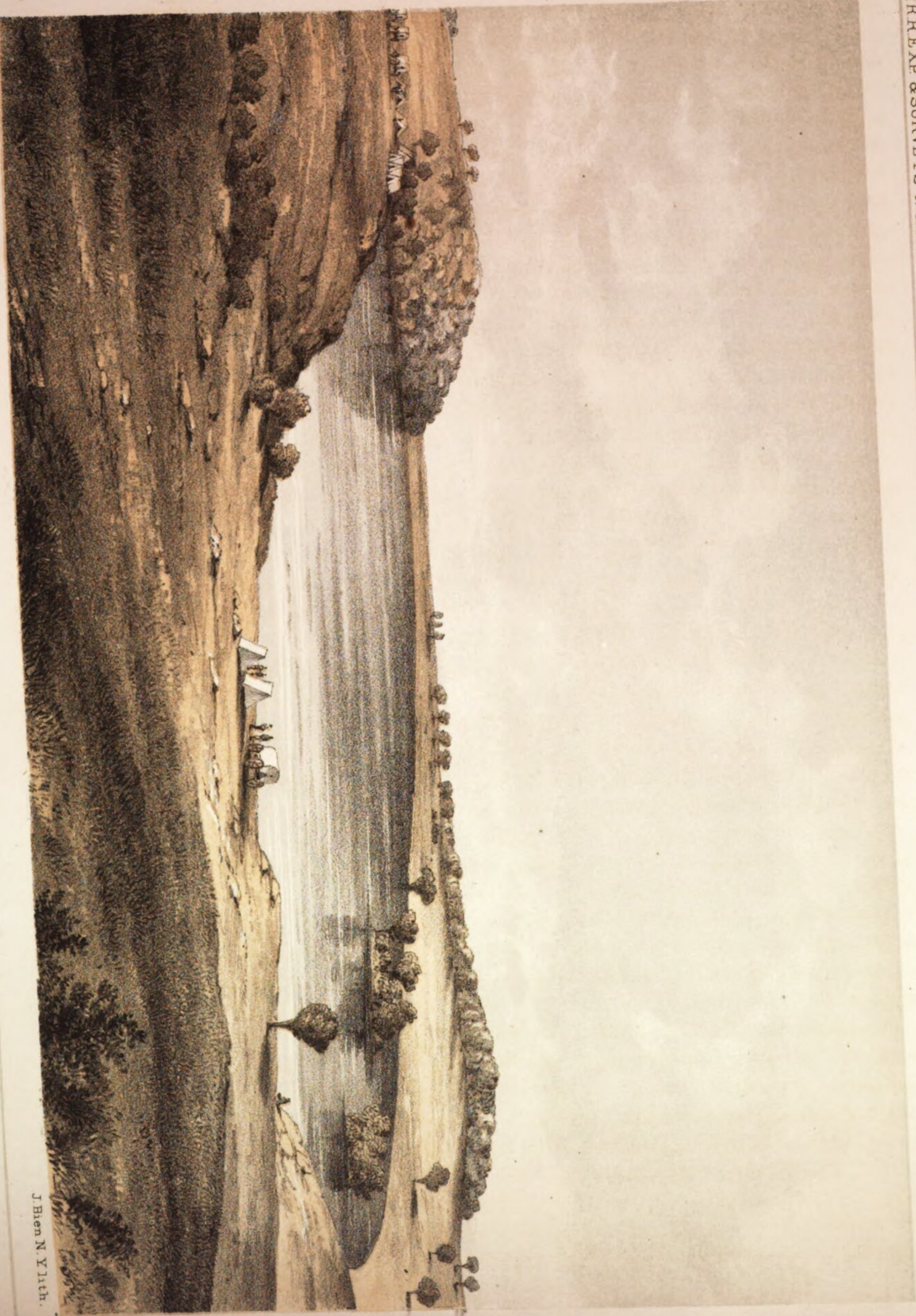


Stanley del.

J. Bien N.Y. lith.

WHITE BEAR LAKE.





Stanley del.

J. Bien N. Yith.

PIKE LAKE M. T.

erable detention. Other bad places occurred; soft bogs, marshes, and brooks, impeded our progress so much that we did not get into camp until 3 p. m., making nine and one-third miles from our halting-place, and eighteen and three-quarters for our day's march.

Our camp was on a very rapid stream, with steep, high banks. We called it Lambert river, in honor of our topographer, who received a sad overturn as he crossed it with Lieutenant Grover's command.

Lieutenant Grover came back to meet us, and reached our party about — p. m., taking dinner with us. He informed us that his party, and that of Messrs. Tinkham and Lander, were encamped at Pike lake, some five miles in advance.

The main train, in charge of Mr. Osgood, moved from the camp on Lightning lake at seven o'clock, after settling a difficulty of a very serious aspect, growing out of a strike of all the teamsters, in consequence of a discharge by him of six of their number, according to my directions, because their services were not required. They threatened to shoot the first driver who moved out of camp. Mr. Osgood declared that he would drive out each wagon himself. Finally, after some discussion, the discharged men moved off cheerfully, and the main train pushed forward to White Bear lake, where they encamped with Dr. Suckley.

June 23.—Our first labor this morning was to cross the stream at a point some half a mile from our camp, from which we moved about six. This crossing delayed our little party some two hours. Grass had to be cut and placed on both sides of the stream. At the point selected for the crossing an island had been formed, with a sort of bar running out where the stream was more shallow than in other portions of the channel. The banks were steep and soft, and it required the presence of a man or two at each wheel to keep the wagons in motion, and prevent their being stuck in the mire. Four and a quarter miles further on we found another very bad crossing at a swiftly-flowing stream, probably a tributary of the St. Peter's river. The water between the banks is about fifteen feet in width and four feet deep. The bottom was gravelly, and by mowing grass and covering the marshy borders on each side a practicable crossing was readily obtained, over which we passed without breaking bulk. The country to-day appears admirably adapted to grazing purposes, and the bottoms, of frequent occurrence, are of a very rich and light character.

Marshes and little streams, bordered by soft places, occur frequently in the march to Pike lake. In one of these places, fully 100 feet in length, one of our wagons got mired, making it necessary to remove part of its load to get it through.

About 10 a. m. I left the train in charge of Mr. G. W. Stevens, and pushing on reached Lieutenant Grover's camp about twelve. The train arrived at half-past one, crossed a marsh and a small stream, and encamped opposite the camps of Messrs. Grover, Lander, and Tinkham.

Lieutenant Grover's camp is beautifully situated on the shores of the lake, (Pike lake.) The main train and Dr. Suckley's party arrived about half-past eight, and the whole expedition was again brought together. This I consider as the real starting point of the expedition, and named our camp here Camp Marcy, in honor of the Secretary of State. We remained here a day, in order to give the animals a chance to rest. They appear to be in very good condition, and the grazing is fine. Received of the various scientific chiefs reports of their labors to this point.

PIKE LAKE TO THE GRAND COTEAU DU PLATEAU DU MISSOURI.

June 24.—I directed Lieutenant Grover to select a party of twenty picked men, twenty-six mules, three horses and twenty-five days' provisions, including an ox, with which to go forward on the Dead Colt Hillock line. Towards evening they were all chosen, including Belland as guide, Davis as meteorological observer, Evelyn in charge of train, six voyageurs and teamsters, and eight dragoons, under Corporal Coster, besides Corporal Cunningham, to run the compass line. In thus giving to Lieutenant Grover his own selection of animals and men my purpose was to make him in the highest degree effective in the means at his disposal and to demonstrate by the success of his undertaking the entire feasibility of operating in detached parties. Messrs. Lander and Tinkham, with their parties, moved forward this afternoon to Chippewa river, the former to stretch a rope across and prepare his canoe for crossing.

On counting rations it was found that for the main party there was a supply for twenty days, while it might take forty-five to reach Fort Union. But with the eight oxen in the carts and the known abundance of game, I feared no scarcity. The men showed some anxiety and talked of a strike, but, seeing the confidence of the officers, abandoned any open demonstration. Previous to this time I had ordered a reducing of rations whenever the quantity of game would justify it, and henceforward I gave the most particular attention to it, so that, although we did not reach the Yellowstone for thirty-eight days, (August 1,) there was at no time a scarcity of provisions.

June 25.—To-day the expedition may be considered fairly under way. Lieutenant Grover started at 7.30 a. m., with instructions to leave Pike lake at this point, cross the Bois de Sioux near Lake Travers, and proceeding in the general direction of Dead Colt Hillock, continuing to the north of the Yellowstone, making the best survey of the country that the means placed at his disposal would furnish, and connect his line with Lieutenant Donelson's survey of the Missouri at some eligible point, as at Fort Berthold; the point, however, to be selected being left to his discretion. He was provided with a Schmalcalder's compass, an odometer, and the necessary meteorological instruments for the altitude. I expressed the hope that he would reach the Yellowstone before me, and directed that every opportunity of communicating with me should be availed of.

The main party, under my own direction, (and guided by Boutineau,) moved forward at about the same time. Still continuing on the Red river trail, in two miles from camp came to a running stream two and a half feet deep, with marshy banks, making it difficult for the animals to obtain foothold, and on the west side a continuous bog, on which all the grass had been burnt off. Here two wagons were stalled, but the men cheerfully put their shoulders to the wheel, and after a little delay brought them to the firm ground. The balance of the train leaving the trail found a ridge about a quarter of a mile to the north which avoided the difficulty. In ten miles reached the Chippewa river. The riding animals were crossed over the Chippewa and the teams without their loads by following a bar running well down the stream, the entrance to and exit from the stream being two hundred yards apart along the river. The India rubber boats did good service, carrying over each time over half a wagon load. The whole train was all well encamped two miles further on, at a fine lake, by sunset.

Much of our march to-day was made entirely out of sight of wood, and the last few miles before reaching the Chippewa the country was indifferent and the grass thin and poor. Crossing the Chippewa we again find a rich soil and excellent grass. Lakes bordered by wood

are still numerous, which furnished our hunters with abundance of geese, ducks, &c. The gentlemen of the scientific corps and myself reached camp about three o'clock, soon after which I sent forward Lander and Tinkham to the Pomme de Terre river.

June 26.—The main party moved to-day to the camp of Mr. Tinkham of last night; the head of the column reached the river at eleven o'clock, and the whole command was over and in camp by six o'clock. This river is the "Pomme de Terre" of Pope's map, but Boutineau says it is the Chippewa, what we crossed yesterday being one of its branches. As we were now approaching the Indian country I systematized all the arrangements of camp and guards and the details of duty on the march. The dragoons were distributed as follows: two for the pack train; two, with a led horse each, for reconnoitering duty; two to strike and pitch tents; two to catch fish; two with the howitzer; the sergeant, Lundner, and seven men with the main column. The sergeant was moreover charged with the duty of laying out the encampment, under my directions. For the care of the camp an officer of the guard, who also served as officer of the day, two non-commissioned officers, and six privates were detailed.

Cook fires to be made at two o'clock a. m.; the cooks and teamsters called at three, and the animals to be put in good grass; reveille to be sounded at four, and all the officers to be called by name; the whole camp to breakfast about four, and the teamsters immediately to commence harnessing up; tents struck at half-past four, and camp in motion by five; the sentinels instructed to fire upon any prowling Indians.

The following anecdote illustrates the good feeling and zeal which prevailed in the camp, and the disposition to derive amusement even from the execution of laborious duties.

Mr. Moffet, who, since Lieutenant Du Barry's departure, has been in charge of meteorological observations, with the rank of "lieutenant," was to-night officer of the guard. He is one of the most inflexible men in the party, rigidly interpreting orders and making the most strenuous efforts to discharge his duties. He never enters upon anything without a determination fully to perform it, having a certain pride in his peculiar mode of doing so, and in guard duty seems to take an especial pleasure. At sundown the guard was summoned to report to their officers. He paraded them outside the line, showed them the position of the various posts, and addressed them in a speech, in which he enjoined them to be on the alert, although we did not apprehend any danger. "Your chief duty will be to watch the animals within camp" (here came a pause, he dreading to mention Indians,) "and *without*." The speech over they were ordered to "get into line," and Corporals Gear and Evans accompanying, paraded them around camp, Farnham whistling the ever-memorable "Yankee Doodle." From a line they were ordered to "get into double file," and in this way were marched up to my tent, and reported ready for duty.

June 27.—Camp roused at 4 a. m. While at breakfast Lieutenant Moffet gave me notice that we had but "four minutes left to eat in," and as we failed to get through he had the tents struck over our heads.

The train moved at five o'clock. About eight miles from camp passed Elbow lake, so called, and most appropriately too, by Major Wood. After a march of fourteen miles over an excellent road reached the "Rabbit river" of Captain Pope's map, (which Boutineau insists is the Pomme de Terre.) The crossing of the river at the trail is quite difficult, and stream deep and trail ground on both sides. We therefore followed the stream to where it empties into Bell's lake, and then going along the beach through water eight inches deep, with a pebbly bottom, we found a good crossing, though a ridge has to be ascended before getting upon the plain where our camp was placed. The grass is most excellent, and the animals, now accus-

tomed to each other, are visibly improving. Here we have our last wood before reaching the Bois de Sioux.

Sent out Mr. Lambert on a short reconnaissance towards the north, when he had the misfortune to lose his Schmalcalder's compass, and though diligently sought for by him the next day it was not found. A severe thunder storm occurred this afternoon. Our hunters brought into camp a small quantity of game—a sand-hill crane and three ducks.

Tuesday, June 28.—We were delayed an hour this morning in getting off. Within two and a half miles of camp two marshy places occurred, beyond which was a broad belt of level prairie, extending north and south as far as the eye could reach. At 10½ a. m. the advance had crossed Rabbit river, fifteen miles from camp, and halted till the arrival of the main train. Leaving the train to rest, the advance started at 2½ p. m., and in three miles met Mr. Lander, whose camp was with Mr. Tinkham's, on the Bois des Sioux. Continuing on we went into camp at 5 o'clock, about three fourths of a mile from the engineers' camp, and were joined by the whole party at 9 o'clock, after a march of 27 miles over a country which had been invariably reported the very worst of the whole route. Our animals, though somewhat tired, immediately went to feeding. There were some soft places between the Rabbit river and the Bois des Sioux, in which animals were mired and wagons stalled; but we were agreeably disappointed in having, comparatively, a very comfortable day's journey.

From our morning's camp I sent Lambert to Red river, with four men, to reconnoitre along its course to the Bois des Sioux, and thence along the latter stream to our evening's camp; and from Rabbit river I despatched Mr. Doty and two men to follow the Rabbit river some eight or ten miles, thence, crossing on a line about parallel to our trail, to the Bois des Sioux, to follow down the latter stream to camp.

Numerous large catfish were caught this afternoon, some weighing 12 to 20 pounds each. At 11½ p. m. we sat down to a supper of ducks, catfish, and coffee, and all the men were in fine spirits. The Bois des Sioux had been a great point to reach—the end of bad roads and the commencement of the buffalo country. It is quite a large stream, is well lined with wood, and the drift deposits on its banks indicate that during spring freshets a considerable portion of the prairie is submerged.

Here we may make a general review of the country passed over since leaving St. Paul.

In the 79 miles between Camp Pierce and Sauk Rapids the road passes through beautiful prairies and oak openings, with occasional meadows, wet at this early season, and, at some distance to the right, groves of tamarack, varying the landscape with their light and feathery foliage.

The entire country on the east side of the Mississippi, from St. Paul to Little Falls, presents facilities for railway construction seldom, if ever, exceeded; one hundred and twenty miles of level or slightly rolling gravel prairie supersedes all necessity for ballasting, &c.

From the crossing at Sauk Rapids to Lightning lake, where the party was divided, most of the country is rolling prairie, with the wooded banks of Sauk river on the south, and numerous small ponds and lakes, with trees on their banks, abundant and excellent pasture, and swarms of water-fowl supplying plenty of fresh provisions.

A similar delightful country continues to the Bois des Sioux river, with some decrease in the amount of timber, until the banks of that river are reached.

After leaving Lightning lake the country seems to change its character; no longer a flat undiversified surface, or with gentle undulations scarcely attracting notice, it has gradually changed



Stanley del.

J. Bien N. Y. lith.

BOIS DE SIOUX RIVER.

to a heavy rolling prairie, and, at White Bear lake, becomes broken up into hills, valleys, and basins. Boulders and smaller stones are numerous. At a distance of thirty miles toward the north of our line the route from Little Falls to the Bois des Sioux is represented as passing over high sandy plateaux, broken by low ridges and interspersed with shallow swamps; the upland country is well timbered with the eastern pine and the swamps well filled with excellent cedar.

This whole dividing ridge, then, separating the waters of the Mississippi from those of the Red river, which flow into Hudson Bay, is not the lofty range of mountains which might be supposed to separate the sources of two such great bodies of water, flowing in opposite directions and to outlets so widely distant, but is a gently undulating and exceedingly rich prairie country, abundantly wooded and watered, having a width of one hundred miles, and an elevation not exceeding 600 feet above the river and about 1,600 above the sea. There is a very slight rise in the general level in going westward, the Bois des Sioux being, at the crossing, only 31 feet higher than the Mississippi at Sauk Rapids. Undulating and level prairies, skirted by woods of various growth, and clothed everywhere with rich verdure; numerous and rapid streams, with innumerable small but limpid lakes, frequented by multitudes of water-fowl, most conspicuous among which appears the stately swan—these, in ever-recurring succession, make up the panorama of this extensive district, which may be said to be everywhere fertile, beautiful, and inviting.

The most remarkable features of this region are the intervals of level prairie, especially that near the bend of the branches of Red river, where the horizon is as unbroken as that of a calm sea. Nor are other points of resemblance wanting; the long grass, which in such places is unusually rank, bending gracefully to the passing breeze as it sweeps along the plain, gives the idea of waves, (as, indeed, they are,) and the solitary horseman on the horizon is so indistinctly seen as to complete the picture by the suggestion of a sail, raising the first feeling of novelty to a character of wonder and delight. The flowing outlines of the rolling prairies are broken only by the small lakes and patches of timber, which relieve them of monotony and enhance their beauty; and though marshes and sloughs occur they are too small and unfrequent to affect the generally attractive character of the country. The elevation of the rolling prairie is generally so uniform that even the summits between streams flowing in opposite directions exhibit no peculiar features to distinguish them from the ordinary character of the valley slopes.

Wednesday, June 29.—The advance parties crossed the river before 7 o'clock, but the train was not started till 11, so as to give the animals rest. The ford, very good for a small train, became very muddy toward the last, and though we unloaded all the wagons and carried on the loads in boats, the wagons and animals were badly stalled at the edges and on the soft and steep banks of the river. The country from the Bois des Sioux to the Wild Rice river is a broad level prairie, covered with luxuriant grass eighteen inches high. The distance on our trail eleven miles, with occasional sloughs. The heat to-day was excessive, and the mosquitoes very annoying to men and animals. At 4 o'clock, profiting by our experience in crossing the Bois des Sioux, I sent Mr. Lander with a select force of axe-men to cut timber to bridge the Wild Rice. The train came up slowly; the last wagons were reaching camp till midnight. Several elk were seen this morning and fired at by Boutineau without success.

Mr. Adams, who had been sent from our morning's camp to examine the Bois des Sioux to the site selected by Major Woods for a military post, thence to cross over to Wild Rice river, and

continue up to the evening's camp, made his appearance about 6 a. m., having acquitted himself very handsomely of this duty.

Thursday, June 30.—Part of the men were employed in carefully currying and washing the animals and in catching fish. Every one in camp at work, the remainder were detailed to build the bridge, which was completed by 1 p. m. It was made of heavy logs, filled in with cut willow brush and mown grass. Moved at 2 o'clock, taking wood along for an evening's camp. In three miles came to a small creek eight feet wide and two feet deep, a branch of the Wild Rice river, which was quite marshy, and caused delay to cross. Moving one mile and a half further, we again struck the same stream and encamped at 4½ p. m. Here was excellent grass and water, but no wood on the side we were on. Portions of the country travelled on to-day are subject to overflow in spring freshets, as is shown by the water lines on the banks of the streams and the deposits on the route. During our march to-day we encountered a very severe storm, accompanied with thunder and lightning. Boutineau brought in an elk, which furnished about two pounds excellent fresh meat to each man, and was much enjoyed. Kendall and the two Boilleaus overtook us to-day, bringing supplies and five Indian ponies.

July 1.—I determined to push forward with the engineer party to the Shayenne, and if I found it necessary have it bridged. Smooth prairie extended all the way; road good, and the distance 26½ miles.

A very severe thunder storm occurred this morning, lasting an hour, and wetting us thoroughly. At 11 a. m. we met the train of the Red river traders, in charge of Mr. Kittson, and visited their camp six miles distant, in company with Dr. Suckley, Messrs. Stanley, Osgood, Boutineau, Menoc, and others. We were very hospitably received, purchased some pemmican, common moccasins, and articles of dress worked with porcupine quills. Bought, also, some carts and oxen, being very deficient in transportation.

The main train only proceeded 13 miles, and I returned to them about 3 p. m., accompanied by Kittson, Father Delacour, Roulet, and Cavilier. Kittson and Roulet were members of the territorial legislature from ———, Pembina; Cavilier, the collector of customs; and Delacour is a very clever, shrewd priest. They are on their annual trip to St. Paul with robes, skins, pemmican, and dried meat of the buffalo, collected by trading with the half-breeds of the Red river settlements. We found that they had bridged the Shayenne, saving us considerable trouble and delay. Their company proved very agreeable, and we were glad that a heavy thunder storm coming on obliged them to be our guests for the night.

July 2.—Struck camp at 7 o'clock and parted with our new friends, sending back with them Strobel and two teamsters, who proved inefficient.

The whole train crossed the Shayenne bridge safely by noon, and camped on the other side. We had apprehended that possibly the heavy rain of last night would swell the river and carry away the bridge, but hurrying up the wagons we made the crossing just before the water had risen sufficiently to flow over the bridge. I called this "Camp McClelland," intending to halt here over Sunday and make up despatches for Washington. I sent Lander and Tinkham to reconnoitre both up and down the river.

July 3.—Sunday.—Lander came back from his reconnaissance, having been as far south as Dead Colt Hillock.

He met with a singular adventure, which it may be well to chronicle, and which afforded us a great deal of amusement. Riding along with his four voyageurs, whom he used to call his "men of iron," at some distance ahead they saw a skunk moving leisurely through the grass,

with tail erect, and defying their approach. Lander levelled his glass at it, and satisfying himself that it was an Indian watching their movements and trying to hide himself, gave the order for his gallant band to "charge." They did charge, and at the same time firing their revolvers, the poor skunk fell riddled with balls and weltering in his blood; when coming up, they discovered the extent of their bold exploit. Joking in camp is one of the pastimes to relieve the annoyances of the march, and every little thing is seized upon to feed the disposition. For the past few days the good idea of Mr. Everett with his old black umbrella, the only *arm* he carries, has furnished the material for considerable merriment.

Fourth of July.—The train started at 6 a. m. I remained behind to get off a mail, and the engineers remained with me. From them I received the necessary reports, and in a letter stated the general character of the route up to this point. After giving an account of the expedition to Pike lake, I wrote: "Lieutenant Grover moved on the morning of the 25th ult., in fine spirits, determined to distinguish himself. I was then confident, and am still, that he will pass over a fine route. It is almost an irresistible inference, from the general course of the streams, as laid down on Nicollet's map. His instructions are to push forward to the Yellowstone, touching, if possible, the Missouri, to connect with Lieutenant Donelson's survey.

"I moved, also, on the 25th, with the main train, and crossed the Shayenne early on Saturday morning, (July 2.) We have moved rapidly to-day, making to next wood a march of 27 miles. We bridged the Wild Rice river, and found a good bridge at the Shayenne, the work of our Red river friends.

"The train is now in motion, and I am behind to make up a mail—the last till I reach the Yellowstone. We shall cross the Shayenne the second time a few miles north of Bald Hillock creek, and shall pass within fifteen or twenty miles of the Miniwakan lake. Thence our course will be nearly straight. With my reconnoitering force I hope to cover a broad belt of country, connecting with Lieutenant Grover's route. The accompanying sketch (one prepared by Mr. Lambert embracing result to this point) will show the character of our work. It is all the result of careful observation. The work north of the route, on the Bois des Sioux, Wild Rice, and Red rivers, was done in a single day by Mr. Adams, a young gentleman attached to the civil engineer's party; that west of our present camp, on the Shayenne, by Mr. Lander, one of my civil engineers, assisted by Mr. Adams and one man. Mr. Lander left this camp on Saturday afternoon (July 2) at 4 o'clock, and returned last evening, a little after 8, having ridden over and carefully observed at least 80 miles of country in 28 hours.

"By a comparison with Nicollet's map it will be seen that the course of the Shayenne at its southern bend is much out of the way, and I have determined to have its southern shore carefully examined by Mr. Lander. He will accordingly start to-day with Mr. Adams and four picked men on this duty, and will be instructed to explore carefully the region along and south and west of the Shayenne river; connecting, if possible, with Lieutenant Grover's route. He has choice animals, and spare horses for reconnoitering. I entertain no apprehensions as to hostile Indians. He will join me south of the Miniwakan lake.

"The sketch indicates the course of Lieutenant Grover and my proposed course to the second crossing of the Shayenne river, and the relative positions of the two routes to the direct course from the Sauk crossing to the mouth of the Yellowstone.

"The country, thus far, is exceedingly favorable for a railroad, no grade over forty feet to the mile. The Shayenne is a great obstacle, and the indications are very decided that the line

must go south. I have indicated a particular railroad route. Without equipment it will not cost over twenty thousand dollars per mile. No important deflection is made. The crossing of the Shaienne at this point will cost say one hundred thousand dollars; twenty miles west, at the point marked on the sketch, not fifty thousand. The general line will, undoubtedly, be better; but when I reach the Yellowstone and have Lieutenant Grover's route before me I shall be able to report more definitely on this portion of the route."

Mr. Lander, with Mr. Adams and four picked men, was accordingly instructed to examine the Shaienne river and the country south and west of its great bend, so as to cover the whole ground between our route and Lieutenant Grover's. He was expected to rejoin us in six or eight days south of Miniwakan Lake.

Got off about 10 and followed the Red River trail some twelve miles, when we left it altogether. Crossed Maple river and camped on its banks, about half a mile from our crossing.

It would be an excellent plan for an emigrant travelling through the country, before reaching one of these rivers on which he expects to camp, to catch a few frogs, for the purpose of fishing in these streams, which abound in pike, pickerel, and large catfish. Frogs are by far the best bait which can be used.

About dusk we raised the American flag, made of white and red shirts contributed by the party and sewed together by Beaubien. As it went up the assembled command gave it three hearty cheers, and then indulged in some refreshments in honor of the day, ending the evening with songs and story telling.

July 5.—Travelled twenty miles over a high, firm, and almost level prairie, more rolling, and with small salt ponds in the last seven miles, camping on a small branch of Maple river, without any wood near it. Saw signs of buffalo, but the hunters were out all day and got none. The pack train requiring more attention and care of the animals than has been given by the man in charge, who does not take sufficient pains with the disabled animals, I to-day directed Mr. Kendall to oversee them and have them properly attended to.

July 6.—Went twenty miles further, making a noon halt of two hours, when Mr. Tinkham returned from a long and rapid reconnaissance ahead, without any change of the scenery. Prairie more rolling, but road good. A high butte to the left of our course enabled me to get a fine view of the surrounding country.

Two Indians were seen by Boutineau, who was out for buffalo, which he did not find; but abundance of ducks continue to supply the camp with fresh meat.

July 7.—Before starting Henry Boilleau came into camp leading his mule, having walked forty miles since sunset yesterday, and left Sergeant Rummell behind. I sent back a led horse for him, and though I urged Boilleau to rest he preferred starting off again with Mr. Tinkham, who was sent out to reconnoitre. His mule he brought in safely. Rummell's was entirely broken down.

On our march to-day the characteristic formation of the country was limestone, and in many places the ground and incrustations on the stone indicate the presence of iron. About 8½ we struck the Shaienne, about six miles from camp, and rested an hour. Keeping the Shaienne on our left we moved forward some ten miles and camped about a mile and a half from the river, on the banks of a fine lake. Here the grass was fine and the water good; but there being no wood I sent a wagon to the banks of the river and had a load brought, which was distributed among the various messes. To-day Le Frambois and Menoc killed an old buffalo bull, and also brought in some dozen geese. Several of the messes supplied themselves with frogs, which



MAPLE RIVER.



Stanley del

J. B. ENN. Y. lith.

SHAYENNE RIVER.

have been most abundant on our march for the past two days. The whole command took supper off of buffalo, and the meat, though old and tough, tasted very good, and saved us an ox which had been destined for the slaughter. Several antelopes and wolves were seen to-day.

July 8.—Started this morning at 6½ and arrived at the crossing of the Shayanne river after a march of about fifteen miles. Buttes in considerable number are seen ahead, among which the Horse Butte and Butte Micheau are plainly visible. Mr. Tinkham, Paul, and Henry were out again to-day, making a reconnaissance on the Shayanne. They came in early, having made a very satisfactory examination. We went into camp about one o'clock, on the east and south side of the Shayanne, and a party was at once detailed to cut wood and prepare charcoal.

The magnetic tent was put up and the astronomical and meteorological parties went immediately to work. I called our camp Camp Guthrie, in honor of the Secretary of the Treasury, and determined to remain here all day to-morrow. As the grass here is very indifferent the main train will cross the river to-morrow afternoon and go ahead some six miles to good grass, while I shall remain with the magnetic party. Travelling along the coteau of the Shayanne, near the place where we encamped, I saw a buffalo, to which Menoc and Le Frambois gave chase, but without success. The plateau of the river, and the coulée opening into it, is observable to-day. Extensive gullies are here found making into the prairie on the one side and the plateau of the river on the other. I descended from the coteau some 150 feet and camped on the plateau alluded to. The grass, at the best, is very poor, and the great abundance of grasshoppers had made sad havoc with what had grown here. This afternoon Mr. Tinkham, Paul Boilleau, and Rummell went ahead to fix the position of Butte Micheau, Lake Jessie, and to make a reconnaissance of the road. Boutineau found a very good ford some half mile from our camp, which needed but little levelling of the steep side banks to make it entirely practicable for our wagons.

The astronomical and magnetic observations of the survey have not, as yet, furnished any satisfactory results. The rates of the chronometers have increased, and no satisfactory data have been obtained by which our longitude can be computed. I feel very anxious on this subject, as I wish to have verified our dead reckoning, as well as determine our position. These unsuccessful results have not been owing to any neglect or indolence on the part of Mr. G. W. Stevens, or his assistant, Mr. Doty. Their time has been fully occupied; they have worked assiduously and overcome many practical difficulties. They have made many very good observations, and but few computations remained to be brought up.

Boutineau and Henry Boilleau went out this afternoon, and returned with the choice pieces of a fine, fat young buffalo bull, and we made a delightful meal around the fire of the hunters' mess of the ribs, marrow bones, &c., cooked hunters' fashion.

Towards evening, on the coteau on the other side of the river, a herd of some twenty elks made their appearance. Numerous wolves were also seen, which, during the night, kept up a constant howling.

We planted flags on high hills in the vicinity, as signals to Lander, who may follow the Shayanne river to find our crossing place.

July 9.—Feeling quite unwell I remained in bed most of the day. An accurate return was made of the provisions on hand, so as to regulate its weekly distribution. Our flour is fast diminishing, and the issue was reduced to half a pound per day to each man. This state of affairs caused considerable grumbling in camp. We are fast approaching the buffalo country, and then shall be expected to do with much less. About 2½ p. m. the main train, under Mr.

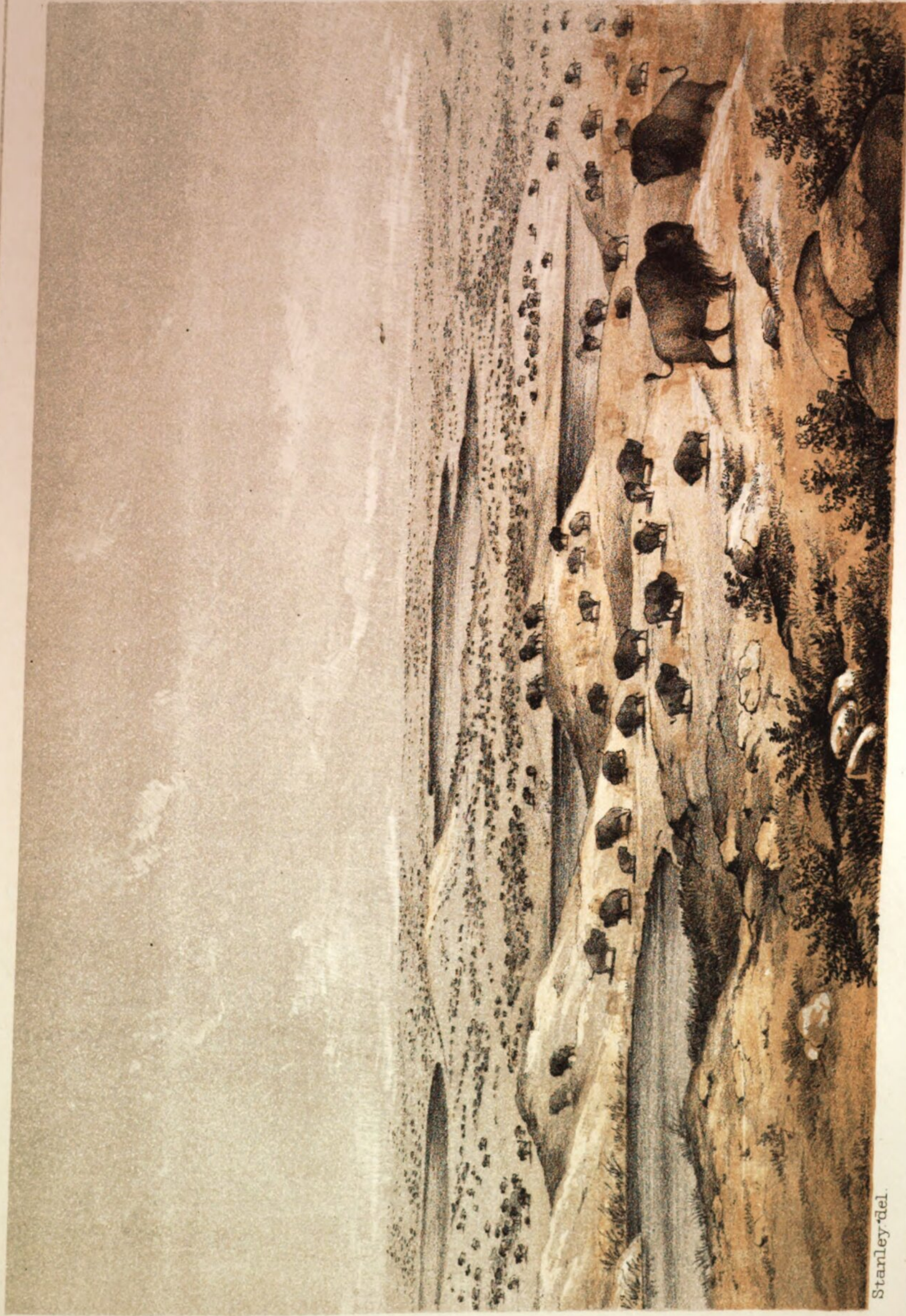
Osgood, crossed the river without unloading any of the wagons or doubling the teams, and moved forward to a good camping place, carrying with them a supply of firewood, as none would be found again before reaching Lake Jessie. The astronomical, magnetic, and meteorological parties, with the detail of three men attending to the "coal pit," and Mr. Evans and myself, remained at Camp Guthrie, intending to join them before they moved on in the morning, and breakfast with them.

About 3 p. m. Mr. Tinkham came into camp and reported that he had been to the Butte Mischeau and Lake Jessie. They found buffalo to be very numerous on our route. Paul Boilleau and Rummel killed some four or five coming back, without going out of the way.

About dusk Paul started ahead for the camp of Mr. Osgood, and, having crossed the river, he commenced singing an Indian song, which Joe said was in the Sioux language. Lemere and Mechall, another voyageur, came running in, and loudly proclaimed that we had but a few minutes left; that we were surrounded by the Sioux. Most of the gentlemen assured them that it was only Paul singing; but Joe knew better; he could tell Chippewa from Sioux, and the song was in the Sioux language. The camp was in commotion, and every arm was inspected and loaded, though I endeavored to laugh it off as a good joke. Myself and Evans determined to stand guard, and directed the men to go to bed. Evans went on about 11 o'clock, and continued up the balance of the night, awaking the camp at 3. Grass was cut from the bottoms near by, and the animals were put together as closely as possible, so as to abridge the watch duties. The two frightened men never got over their apprehensions. They would neither go to bed nor approach the camp fires, feeling certain that they would become marks for the Indians, and would not go on guard at all. Evans reported that they were most vigilant and watchful sentinels. I sat up till 12 o'clock, engaged with Messrs. Stevens and Doty in the examination of the astronomical observations, formulæ, &c.

July 10.—Most of our camp arose at 2½ o'clock. After partaking of a cup of coffee at 3 o'clock, our little train, consisting of an ambulance and spring wagons, with a cart loaded with charcoal, had crossed the Shayenne by sunrise. The ambulance, or instrument wagon, being too heavily loaded, was detained on the west side some half hour, in consequence of the soft state of the ground preventing the animals from securing a good foothold. About 7 o'clock we reached the main train, encamped some seven miles off. The train was preparing to move, and soon after we came up it started. At 8 o'clock we followed and passed them. About five miles from camp we ascended to the top of a high hill, and for a great distance ahead every square mile seemed to have a herd of buffalo upon it. Their number was variously estimated by the members of the party—some as high as half a million. I do not think it is any exaggeration to set it down at 200,000. I had heard of the myriads of these animals inhabiting these plains, but I could not realize the truth of these accounts till to-day, when they surpassed anything I could have imagined from the accounts which I had received.

The timber bordering on Lake Jessie was distinctly visible ahead, and between us and it were countless herds of buffalo, through which we were compelled to pass. The train moved on till 11 o'clock, when we all halted, drew up into line, and picketed the loose animals. About half a mile ahead a large herd was to be seen. Six of the hunters, Boutineau, Menoc, Le Frambois, the two Boilleaus, and Rummel, were mounted upon the best horses in the command, some of which were specially reserved, and rode off in fine style, keeping together till ready to dash in among the herd. The immense sea of flesh remained quiet until their approach, and then, separating, they rode in among them, selected the fat cows, and riding around until



Stanley del.

J. Bien. N.Y. lith.

HERD OF BISON NEAR LAKE JESSIE.



Stanley del.

Hier N.Y. pub.

LAKE JESSIE.

the proper time to do execution, the quick succession of shots announced the fact that our supplies of meat were fast being added to. In less than an hour a wagon or two was called into requisition to collect the choice pieces of nine buffalo cows. While we were resting several small bands came within firing distance of our train. One or two dragoons, on foot, gave one a chase, but the buffalo of course distanced them. The most amusing scene was the dog "Zach," of the dragoon detachment, dashing into a whole herd and following them a considerable distance. We arrived at Lake Jessie about 3 o'clock p. m., the bluff shore on which we encamped being some sixty-four feet above the level of the lake. Paul Boilleau and Rummel were both thrown by their horses stumbling in one of the numerous holes in which the prairie abounds. They were considerably, though not seriously, hurt. The water of Lake Jessie is considerably saline in its character, but about three-fourths of a mile from camp an excellent spring of good fresh water was found by Henry Boilleau and myself while out on a reconnoitering trip. This discovery afforded a pleasant relief from the brackish water of Lake Jessie and the surrounding lakes.

This is the last point on the trail in which our work will connect with Nicollet's survey, and to-night our camp is pitched upon the same spot where he encamped some sixteen years ago.

Between 1 and 2 o'clock at night a herd of buffalo approached our camp, and it required all the exertion of the guard, assisted by many of the men, to prevent an entire stampede of all our animals. As it was, some got loose, though none were lost. The buffalo were followed a considerable distance, and some ten or a dozen shots were fired before "the animals without" were entirely driven off.

July 21.—Fearing that the water in advance of the party would prove to be of the same character as that which we had left behind, I ordered two casks to be filled with spring water. Lake Jessie being the last point of Nicollet, I instructed Mr. Tinkham's party to run a line of levels, and Mr. Morfett to make corresponding barometrical observations to verify the work, thus securing a good profile of the country we go over.

Having proceeded about four miles a small band of buffalo started off ahead of us. Le Frambois' horse and four loose mules near the head of the column started in pursuit, the horse taking the lead. Boutineau, Le Frambois, Menoc, Guy, Lindner, and Paul Boilleau, (who, though laboring under severe indisposition from yesterday's throw, and had ridden in the ambulance up this point, insisted on going,) all well mounted, gave chase in hopes of recovering them. But by this time they had mixed up in the herd, and though they were followed some twelve or fifteen miles, their efforts were entirely unavailing. About a mile further we encountered a very severe slough, the approach to which was marked by a very great curiosity, in the form of a buffalo trail; at least 100,000 must have crossed here by the foot prints and marks visible, and I determined on crossing the slough at the same point which the instinct of these animals had selected.

Our whole march to-day was only ten miles, and we reached camp about 5 o'clock. Our camp was beautifully surrounded by hills, the grazing excellent, and the water passably good. A high hill overlooked our camp, to the top of which Tinkham, Lambert, Boutineau, and myself went to reconnoitre the country ahead to determine the line of our march to-morrow.

July 12.—In company with Tinkham and some of the guides I started from camp this morning at 5 o'clock, designing to be in advance of the train some miles to reconnoitre and pick out a good road, our route lying over high hills. The main train did not get off until after 7 o'clock, being delayed by the repairing of an axle of a wagon broken yesterday.

From the reconnaissance of yesterday evening from the hill near the camp I observed two ranges of hills, with a plateau between, which I concluded to be the dividing ridge of the tributaries of the Jaques and Shayenne rivers, and I resolved to change our course so as to strike for the plateau. I therefore determined our course N. 85° W., with instructions to Boutineau to keep in advance and point out the way, which was not to be abandoned except in crossing shoughs, and then to return immediately. This is the first day we have run according to the compass, and it succeeded admirably.

At about 8 o'clock I sent off Mr. Tinkham, accompanied by the two Boilleaus, well mounted, with instructions to go southward, determining the position of the head waters of Bald Hillock run, and thus connecting his work with Mr. Lander's reconnaissance; thence westward in a line nearly parallel with our route of to-day, making a reconnaissance of the tributaries of the Jaques river, leaving it to his own discretion whether to join our camp to-night or the next day. By this we would secure the reconnaissance of a belt of country forty miles wide, lying between the Shayenne and Jaques rivers.

About eleven miles from camp we crossed a deep slough. The water here being good the train stopped an hour and lunched. About a mile further on we crossed a fine little stream, which I took to be Beaver Lodge creek. Shortly afterwards Boutineau killed a fine buffalo cow, not twenty feet from the compass line. The despatch and dexterity with which these men cut up buffalo is truly astonishing. Before the train came up the animal was entirely butchered, and had only to be thrown in the cart.

We moved forward to-day some sixteen miles, and encamped on the side of a small lake. The water and grass were both very good, but there was a scarcity of wood. We had scarcely got into camp before we were visited by a very severe storm, accompanied by thunder and lightning. Our fires were put out by the rain, and during a temporary cessation were built up again; but it soon came on with increased violence, and our fires were again washed out. About 6 o'clock two of Mr. Lander's party who left us on the 4th arrived in camp, announcing that Mr. Lander and the rest of his men were only some three or four miles behind, with considerable difficulty bringing in the horses, which were giving out. I despatched two men with led horses to meet them, and about sundown they came up. We found great difficulty in keeping up our fires so as to get our supper cooked. The rain fell in torrents; our supply of wood was limited, and the buffalo chips were so wet as to be entirely useless. Mr. Lander's party had only fifteen pounds of flour when they started, and for some days had lived exclusively upon game. On the evening of the 8th they saw a large buffalo bull, the first one they had seen, and immediately Mr. Lander and three men started in pursuit. The bull distanced the tired horses, with the exception of the blood mare ridden by Mr. Lander, who overtook and killed the animal with his revolver, after considerable struggle, the bull running on him twice. On the party reaching him, one of the horses took fright at the sight of the dead buffalo. He was followed all night by Augustus Lebat, the balance of the party going into camp, and by Mr. Lander and Lebat all the next day and night, the other animals and men embracing the opportunity to recruit, which they so much needed. After every effort to recover the animal without success, they abandoned the pursuit, rejoined the little party, and pressed forward to overtake the train. The killing of the first buffalo by the expedition belongs to Mr. Lander, it being one day previous to the killing by Menoc of one on our train. They packed as much of the meat as possible, and when it became exhausted they collected the refuse meat abandoned at our various camping places. One of the horses brought in was entirely worn out, and the

men were very much fatigued. After supper I engaged some time in conversation with Lander and Adams, and then had Boutineau and Lambert visit our tent, and by a consultation with our maps determined on taking, as the course to-morrow, N. 80° W., in order to strike a point thought by Boutineau to be some eight miles north of a large hill some eighty miles beyond here—an excellent landmark, of which Boutineau asserted his knowledge. This hill must be the "Maison du Chien," and is visible some thirty miles.

Towards the close of the day's march I became disabled from my exertions in endeavoring to keep off a herd of buffalo from the train, causing an old wound to break out, which compelled me to ride many hundred miles in the ambulance.

July 13.—A very heavy fog this morning delayed our getting off as early as expected, and the hope of Tinkham and his small party joining us made me less hurried about starting. We were encamped on the banks of a lake, being almost entirely surrounded by sloughs; to avoid which we had to make a considerable detour. About 11 miles from camp we made a halt on the banks of a slough, where we lunched. Our road to-day is over a level plateau, one or two sloughs interrupting our progress, but causing no serious delay. Just before coming to our noon halt we found a large patch of strawberries, from which the men were enabled to gather a considerable mess. Sixteen miles from camp we struck James river, and crossed over a good ford, from which point I sent Mr. Lander down the river to examine it. Noticing that the river ran very nearly in the course of our compass, we followed it, and again crossing it some five miles above we encamped. The engineer party with the odometer did not cross the river, but pursued the compass course. Boutineau accompanied them, to get them through a bad slough in the line. We arrived in camp about 5½ o'clock, and I sent Le Frambois to the engineer party to join us in camp, which was about three-fourths of a mile above their line. Both the fords of this river which we crossed were excellent; but between the two the water was in some places very deep, while at others it widened out until it almost resembled a lake, the current running about a mile an hour. Along the banks the grass is very indifferent, and in many places there is an abundance of large pebble stones. At the fords the bottom is gravel and pebbles, while in the deep places a clay mud seems to prevail.

At our camping place the grass is good, the water passably so, and wood scarce. Early after encamping I had a large amount of rushes collected, with a view of building as large a camp fire as practicable, in order to give notice to Tinkham of our position, he not having returned.

July 14.—The missing party not having arrived, three rounds of the howitzer were fired at sunrise, and we started later than usual. It was evident that the whole camp was in a great state of anxiety for the safety of our comrades. Many believed that they had fallen in with Indians, and were deprived of their horses and their lives; others thought that the exposure without blankets or food had probably caused the sickness of some member of the little band; others feared their animals had stampeded, and that the party were delayed by endeavoring to recover them; some thought that they had crossed our trail, faint as it was in some places, and being unable to determine our course were possibly moving still further from us.

Taking everything into consideration, I deemed it best to leave a party at this point so equipped as to combine great energy and force with promptness of movement, so as to be able to overtake the main train without difficulty. Accordingly, Mr. Lander was left in charge of the engineer wagon and wagon belonging to the mountain howitzer, which were made light enough to be moved with ease 40 miles in a single day. The howitzer was also left with him for the purpose of making signals. Mr. Doty, with three voyageurs, and three men to manage

the howitzer, together with the teamsters of the ammunition wagon, remain with Mr. Lander, having abundance of arms, provisions, animals, &c., to supply any emergency.

This party was instructed to keep up fires, to fire three rounds with the howitzer at noon and at sunset should the party not arrive, and communicate with us if any casualty occurred.

A party of four brave and thorough woodsmen, whose knowledge of the prairie life was derived from experience in many expeditions, and who well understood the Indian character, were sent out on the route travelled yesterday; after travelling some ten or twelve miles to leave the road, and going in different directions, plant signals and scour the country. I felt certain that Mr. Tinkham and his party would be found by these men, if found at all.

The remainder of the train left about 7 o'clock, pursuing the same course as yesterday. The first ten miles was over a level plateau. We met with but one slough which presented any obstruction to our march. Our mid-day halt was on a high hill, in sight of a large herd of buffalo, which the hunters pursued, and succeeded in killing two fine cows. The wagon had to go only some half mile off for the meat. Parties were sent out to collect buffalo skulls and ribs, and twigs of the "grease wood," which abounded in several places along the route. The twigs were made into bundles and thrown into the lightly loaded wagons. About six miles from the halting place we came to a long marsh or slough, in which the engineer wagon got "bogged." The others pursuing a different route passed through with some difficulty.

After travelling sixteen miles we came to a considerable quantity of "brush," much larger than that above alluded to. Here we stopped to rest the animals, and while they were feeding all the command were engaged in collecting fuel. In a short time we had sufficient for to-night and to-morrow morning. We moved on and encamped about 4½ o'clock at the bank of a fine lake, having made to-day a distance of little over 20 miles. The grass was excellent, but the water was very indifferent; it was slightly brackish, and had to be strained before being used. This has been the character of the water for the past few days, and has affected both animals and men; many are now taking opiates to correct the purgative effects produced by drinking it. The Shaienne river is said to be only some eight or nine miles ahead, and if a good crossing or camping place is found on it we will move forward to it.

The mosquitoes are exceedingly annoying, flying against the sides of the tents with a noise like the pattering of rain, while the inside is perfectly black with them. Their constant humming drove the men out into the open air, and rendered it almost impossible to sleep.

July 15.—At daybreak Broadwell went back to Lander's camp, and I despatched Osgood and Kendall to a high hill to reconnoitre and look for a new camp. The guides and hunters were also sent on to the Shaienne to ascertain the distance, and if not too far we would go to it. Being very unwell I laid by all the morning, and the delay of the train was employed in shoeing the animals, equalizing loads, and arranging them in such a manner as to give about 900 pounds to each wagon, and so distributed in bulk that a portion of each could be appropriated to the conveyance of wood and the meat killed each day.

I feel encouraged in regard to the astronomical observations, by the industry of Mr. Stevens, and confidence in his own success.

The men are much interested in the labors of Dr. Suckley, the naturalist. It is amusing to see each one making their contributions of snakes, reptiles, birds, bugs, &c.

Near noon Osgood and party returned, having been to the Shaienne, where they found no wood, poor grass, and swarms of mosquitoes. Soon after the guides returned, announcing that they had seen a party of Sioux of 1,000 lodges, not more than nine miles in advance of us. Bouti-



Stanley del.

J. Bien, N.Y. lith.

CAMP RED RIVER HUNTERS.

neau's manner was full of fear, and his public announcement spread alarm through the whole camp. I at once gave orders to make ready, with the intention of visiting their camp; and calling Boutineau to my tent, asked him whether they were not the Red river hunting party. He assured me indignantly that "he knew half-breeds from Indians, and that they were certainly Sioux."

I suggested that it might be the Sioux, who, being engaged in the hunt and hearing of our approach, were coming forward to meet us, to receive the usual presents and gratify their curiosity. He still insisted that they were Sioux, and saw in their presence the explanation of the cause of the absence of the missing party. We were, in his opinion, to be surrounded and cut off.

After dinner, as the alarm was spreading throughout the command, the arms were inspected and ammunition distributed, and orders given to have the train in readiness to move at once. I sent Boutineau, Le Frambois, and Menoc to the top of a high ridge as a lookout, while a flag was prepared to be sent forward if necessary.

Word soon came that the country was alive with Indians, who were fast surrounding us; and I sent scouts to hills on the right and left, having the lake to protect our rear. Mounting my horse I rode to the hill in front, and saw two horsemen rapidly approaching. Our flag-bearers rode forward to meet them, and soon discovered that they were two of the Red river hunters, and that their camp was three miles beyond the Shayenne. Having discerned our party, they came to invite us to visit them and express their kindly feeling for us.

The train, which, before this, was in motion, arranged in a double line with the pack and loose animals between, proceeded two miles, where there was better water, and encamped.

The agreeable disappointment established a fine feeling throughout camp; and half an hour after Boilleau and Lindner arrived in camp with news of Tinkham's safety, which was received with three cheers.

The men to-day showed a good spirit, and, although there was naturally some anxiety, they obeyed every order with alacrity.

Thus ended the apprehensions of the command concerning Indians, and was the first and last difficulty of the kind which occurred in camp on the trip.

July 16.—Awaited the coming up of the back parties, and during the morning Tinkham arrived, and was received with nine cheers, being followed soon after by the rest of the rear guard. About 2 p. m. the whole Red river train came in sight, and, as they approached, fired a succession of volleys of firearms as a salute, which we returned with three rounds from the howitzer. The train consisted of 824 carts, about 1,200 animals, and 1,300 persons, men, women, and children, the whole presenting a very fine appearance.

They encamped near by, and the close yard which they formed presented quite a contrast to the open manner adopted by us. They make a circular or square yard of the carts, placed side by side with the hubs adjoining, presenting a barrier impassable either to man or beast. The tents or lodges were arranged within, at a distance of about twenty feet from the carts, and were of a conical shape, built of poles covered with skins, with an opening at the top for the passage of smoke and for ventillation. They were 104 in number, being occupied generally by two families, averaging about ten persons to the lodge. Skins were spread over the tops of the carts, and underneath many of the train found comfortable lodging places.

The animals were allowed to run loose during the day to feed, but were driven into the corral

at dark. Thirty-six of the men are posted as sentinels, remaining on guard all night. We have but twelve guards, three reliefs, not more than four men being on guard at one time.

As our camps were only about two hundred yards apart, there was much visiting between them. I was struck with the good conduct and hospitable kindness of these people. A small band of Prairie Chippewa Indians, who accompanied this party, visited our camp during the evening, and entertained us with one of their national dances.

I was much pleased with Governor Wilkie, who is the head of the expedition. He is a man of about sixty years of age, of fine appearance and pleasant manners. This party are residents of Pembina and its vicinity. When at home they are engaged in agriculture, raising wheat, corn, potatoes, and barley. The land yields about twenty-five bushels of wheat to the acre, their farms averaging about 15 acres each. They are industrious and frugal in their habits, are mostly of the Romish persuasion, leading a virtuous and pious life. They are generally accompanied by their priests, and attend strictly to their devotions, having exercises each Sabbath, on which day they neither march nor hunt.

Their municipal government is of a parochial character, being divided into five parishes, each one being presided over by an officer called the "captain of the parish." These captains of the parish retain their authority while in the settlement. On departing for the hunt they select a man from the whole number, who is styled "governor of the hunt," who takes charge of the party, regulates its movement, acts as referee in all cases where any differences arise between members in regard to game or other matters, and takes command in case of difficulty with the Indians.

In the early part of the year, till the middle of June, these people work at agriculture, when they set out on their first hunt, leaving some thirty at the settlements in charge of their farms, houses, stock, &c. They start out to the southward in search for buffalo, taking with them their families, carts, animals, &c. These carts, when loaded, contain about 800 pounds, and are used in common. There were 336 men in the present train, of whom over 300 were hunters. Each hunt, of which there are two each year, continues about two months, the first starting in June, the second about the middle of October. Their carts were already half full, and they expected to return to their homes in the latter part of August. On their first trip the buffalo are hunted for the purpose of procuring pemmican, dried meat, tongues, &c.; the skins, being useless for robes, are dressed for lodge skins, moccasins, &c. In October the meat is still better and fatter, and they procure a like quantity of dried meat, reserving sufficient for a year's provision, which is about one-half of the whole amount procured; they dispose of the rest to the trading posts of the Hudson Bay Company.

The meat which they carry home finds its way, through the Red river traders of the Fur Company, to Fort Snelling, where it is exchanged for goods, sugar, coffee, &c., at the rate of fifteen cents a pound.

The trade of this company is all in dry goods, sugar, tea, ammunition, &c. Notes are also issued by the Hudson Bay Company, which are currency among them. Several of these, of the denomination of "five shillings," payable at "York Factory," and bearing the signature of Sir George Simpson, were offered in change to various members of the expedition on purchasing various articles.

The skins collected in the summer hunt are usually retained by the hunters for their own use, while the robes are a staple of trade with the Fur Company, and also with the Hudson

Bay Company, which latter company do a large business in this portion of the country, supplying the settlers with most of their clothes, groceries, &c.

The Red river settlements are made up of a population of half-breeds, traders of the Hudson Bay and Fur Companies, discharged employés of these companies, and Indians, representatives of every nation of Europe, Scotch, Irish, English, Canadians, and speaking a jargon made up of these dialects, intermingled with Chippewa and Sioux, patois French being the prevailing tongue.

These settlements, started some twenty-five years since, now number, in the vicinity of Pembina mountain, some four thousand people. The men are generally much finer looking than the women. On the latter depend all the drudging of camp duties, pitching the tents, attending to animals, cooking, &c.

The men dress usually in woollens of various colors. The coat generally worn, called the Hudson Bay coat, has a capot attached. The belts are finely knit, of differently colored wool or worsted yarn, and are worn in the manner of sashes. Their powder horn and shot bag, attached to bands finely embroidered with beads or worked with porcupine quills, are worn across each shoulder, making an X before and behind. Many also have a tobacco pouch strung to their sashes, in which is tobacco mixed with "kini-kinick," (dried bark of the osier willow scraped fine,) a fire steel, punk, and several flints. Add to these paraphernalia a gun, and a good idea will be formed of the costume of the Red river hunter.

The women are industrious, dress in gaudy calicoes, are fond of beads and finery, and are remarkably apt at making bead work, moccasins, sewing, &c.

We purchased from the train a supply of pemmican, dried meat, sugar, and other things, some of the men buying moccasins, whips, and other necessities.

I engaged the services of Alexis le Bombard, who was in company with this encampment, as guide to the Yellowstone. He is represented as having a thorough knowledge of the country, which was apparent from his conversation. He came from the Yellowstone this season, and the impression gathered from my interview with him, as well as the representations of others, satisfied me that he will be extremely valuable as a guide.

Shortly after the Indians left Governor Wilkie and several of the principal men came over to my tent. I had a very pleasant conversation with them in regard to the Indians, hunting, &c. During the conversation I made some inquiries as to their views concerning the establishment of a military post in this vicinity, say at Lake Miniwakan. The suggestion met with their hearty approval, and Governor Wilkie assured me that were one located there the people would remove and settle near it, cultivating sufficient land to keep the post supplied with vegetables and provisions. Governor Wilkie dined with us, after which the train prepared to move, and at 2½ p. m., accompanied by our new guide, Le Bombard, we bade adieu to our Red river friends and moved forward on their trail. Our guide avoided crossing the Shaienne by going around one of its bends, and after travelling ten miles, which we accomplished with ease in two hours and a quarter, we reached a good camping place on the side of a lake, where the grass was excellent.

Sergeant Lindner and Mr. Bixby followed our compass course as far as the Shaienne river, which they crossed forty rods from the compass line, finding a good ford for wagons, the water being not more than eighteen inches or two feet deep. On either side the banks were of gradual declivity, and the country afforded a good road for wagons, although there was some high land.

July 18.—Started a few minutes before 7, still following the trail of the Red river train. The odometer wagon and meteorological party follow the compass line. About 8 o'clock we crossed a branch of the Shayenne, flowing through a deep valley with an extended plateau, bounded on both sides by the high coteau. This stream appears to take its rise in a number of small lakes, and the branch crossed this morning is slightly brackish. Many of the lakes are very salt. These appear to have no outlets, and their saline qualities are accounted for by the fact that they are never washed out and retain the salt deposits and incrustations. We often notice in this region that lakes lying very close to each other, in some cases not more than twenty yards apart, one will be so saline as to be offensive, while the water of the other will be excellent to the taste.

This morning Mr. Lander and private Lawless were sent to the northward of the compass line with instructions to proceed until they reached the Shayenne river, thence to pursue a course in the general direction of the odometer line, about the usual march, and then join us in camp.

Mr. Tinkham, accompanied by Corporal Rummell, was directed to go southward some five or six miles and then pursue a line of reconnaissance nearly parallel to the travelled route to-day, keeping in sight of the train. He would strike the Shayenne above the place forded by the train and join the camp at night.

We passed to-day a narrow lake, some three miles in length, somewhat resembling a canal. It lay at the foot of a high bluff or butte, called the "Butte de Morale." Here occurred an engagement between some half-breeds and Sioux, in which one of the former, by the name of Morale, was killed; hence its name. The altitude of this butte, as determined by barometric measurement, is 281.8 feet above the level of the Shayenne river.

Our way was strewn by the carcasses of many buffaloes, killed by the Red river hunting party. At times the air was very much tainted. One of our men reported having rode through a section of land, some quarter of a mile square, on which were strewn the remains of some three hundred buffaloes. In killing these animals the choice pieces and hides are only taken, while the remainder is left as a prey to wolves or to rot on the prairie.

We had wood to-day for the first time since leaving Lake Jessie, on the 11th instant. Our fuel in the mean time consisting of twigs of greasewood and buffalo chips. The sight of a camp fire of wood is quite a treat to us.

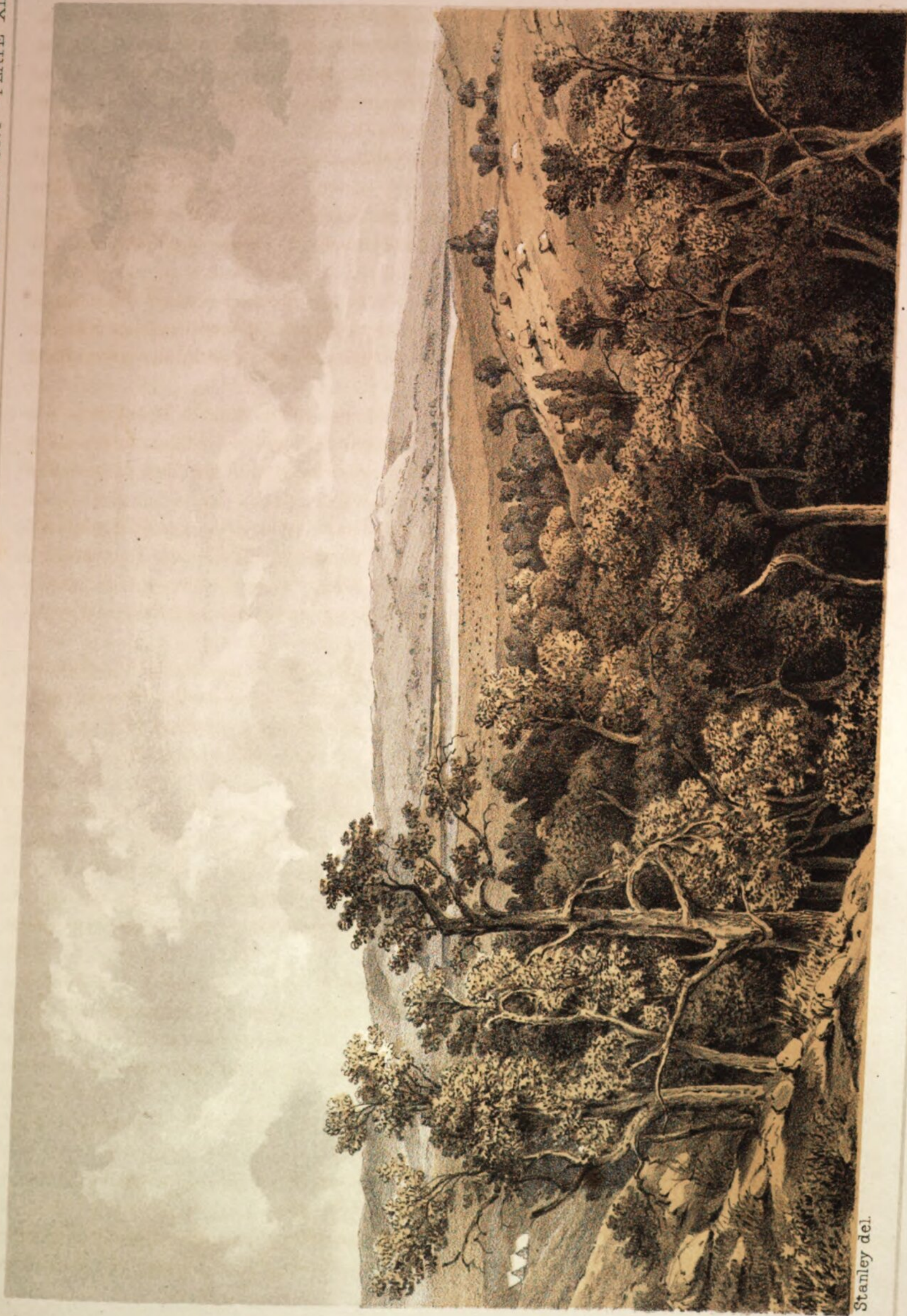
Our camp is beautifully located on a range of hills nearly surrounded with salt lakes. An excellent spring near by furnishes us an abundant supply of cold fresh water. These lakes are called the White Wood lakes.

Mr. Lander arrived in camp about 3½ o'clock, and reported having crossed a branch of the Shayenne, and after passing over eleven miles of flat country again met the Shayenne, which at that point assumed a more serious character as a railroad crossing, the channel between the banks being about one hundred feet deep. He joined the compass line three and a half miles from camp, where he met a lake full seven miles in length.

Mr. Tinkham did not come in until about 6½, having travelled over much more country than I expected.

The odometer line measured to-day was twenty and a half miles; that pursued by the train was probably two miles longer.

July 19.—Moved camp about 6½. The engineer wagon, being loaded lightly, followed the compass course, only varying from it to avoid impassable sloughs or obstructions and then



Stanley del.

J. Bien N. Y. lith

BUTTE DE MORALE.

returning to the line immediately. Our course lay over a level country, meeting some small sloughs, which were passed with little difficulty. After proceeding ten miles we crossed a branch of the Shayenne river, at this time very shallow; but the high banks on each side, together with the grass and deposits, gave evidence of its size during the freshet in the spring. After travelling sixteen and a half miles we encamped near a small lake, in sight of the "Maison du Chien," which, by bearings and calculation, Mr. Tinkham estimated to be about twenty-one miles distant.

We passed on the march several salt marshes abounding with tadpoles, from which the effluvia was very offensive. Frogs also appeared in myriads. In some places the ground was covered with deposits of salt to the depth of a quarter of an inch.

I am much pleased with our new guide, Le Bombard, who appears to have a very accurate knowledge of the country, although his ideas of distance are not found to be very reliable, which is generally the case with voyageurs.

July 20.—Fitted out Lander's party, consisting of himself, Le Frambois, Guy, and Rummel, with a pack mule, to make a reconnaissance of "Butte Maison du Chien" and the "Côteau du Missouri," to connect our work with Lieutenant Grover's survey, and join us on the Mouse river in four days.

We moved off about half-past six, and after travelling about five miles reached the first tributary of the Mouse river. The stream was very deep, being much swollen by a heavy rain which, judging from appearances, must have taken place a day or two ago. The crossing occupied nearly three hours, the water being shoulder deep; half the wagon loads were removed and carried across in the India rubber boat.

The road was generally very good, passing over a level prairie intersected with lakes and sloughs, but presenting no difficulty to our passage. About twelve miles from camp we struck a beautiful ridge, resembling a railroad embankment, which lay directly in our compass course; on the top of this the train moved for some miles. We passed around the first coulée of the Mouse river, and after a march of some seventeen miles to avoid sloughs, &c., (odometer measurement 15.7 miles,) encamped on the bank of a small lake.

We estimate our distance from the point where we will strike Mouse river to be between five and six miles, and by calculation of angles about seventeen miles northeast of the "Maison du Chien" butte. The marshes surrounding our camp abound in ducks, and for the first time on our trip we met with a beautiful variety of the snipe family, white, with fawn colored heads, several species of which the doctor preserved.

July 21.—Left camp at 6 a. m. It commenced raining about 9 and lasted an hour or more. About eight miles from camp we saw the tracks of Grover's train in a slough, by which we judged that he had passed some days previous. Soon after this we crossed one of the coulées making into Mouse river. These coulées are very severe on the animals, in some places being very steep; "the bottoms" at the base are probably one hundred and fifty feet wide, while the distance apart at the top may be some fifteen hundred. In these "bottoms" we generally find a stream or indication of a river channel. Various marks give evidence that there are times when considerable volumes of water pass through these conduits. We passed large excavations made at different places by the violent action of the water. The configuration of the valleys of the Mouse river and its tributaries resemble the Shayenne. High ridges dividing the plateaus, the one bordering the stream, the other extending into the prairie with the coulée. About eleven, Boutineau brought me intelligence of the position of one of Grover's

camps, and from the indications by fire and other marks he must have passed by some four days in advance of us. Desiring to connect his survey with ours, after arriving at camp Mr. Adams, with an odometer wagon, was despatched to the place where Grover's camp was located. On his return he reported that Lieutenant Grover had struck the plateau of the river to avoid crossing the coulées, and had passed along between our line and the river, a mile or so from us, and that his camp was about seven miles from ours.

We travelled to-day 16 miles. Our camp was located on the top of a ridge, which descended into a coulée. We were about 150 feet above the valley of Mouse river. There is plenty of timber in the coulée, which we are to cross to-morrow in starting.

July 22.—Left camp about 6½ o'clock, and found the crossing of the coulée about a half mile to our left. On the other side of the coulée we have a fine, level plateau ahead. The *Grand Côteau du Plateau du Missouri* was in sight all day. The depth of the first coulée, as indicated by the barometer, was some 82 feet below our camp. About four miles from camp we crossed another severe coulée, 108 feet below the level of our camp. The third coulée was a depression of 54 feet, the prairie level being some 42 feet lower than the level of our last camp.

While making our usual mid-day halt we were overtaken by two hunters from the Red river train, from the vicinity of the Selkirk settlement, who were encamped some eight miles distant. They invited me to visit them, which I determined upon doing, and placing the train under the charge of Dr. Suckley, I gave him directions to move on some eight miles, find a good camping place, and await my return. All the men were to be set to work as soon as they got into camp, and none were to be permitted to visit the Red river train. Mr. Tinkham and an assistant were to go to Mouse river, and Mr. Moffett and an assistant were to be despatched to the Grand Côteau and make a profile of the country.

July 23.—During my absence this morning Dr. Suckley sent ahead Le Bombard and Sergeant Lindner some twelve miles, to reconnoitre for a good road for the train; Messrs. Tinkham and Burr went to the Mouse river, and Mr. Moffett, accompanied by Broadwell, went to the Grand Côteau.

I sent Guy and Rummel ahead to Dr. Suckley's camp to apprise him of our coming. At about 4 o'clock, accompanied by Governor De L'Orme and seven of his principal men, we started towards Dr. Suckley's camp. The whole force of the survey, headed by Dr. Suckley, Sergeant Lindner bearing an American flag, met us about a mile out of camp, and saluted us with a volley from their guns, the mountain howitzer being fired three times. A large tent was put up for the accommodation of our guests, and Governor De L'Orme was invited to share my tent. The guard tent was taken and made use of as a banqueting room, and several of the men were detailed to collect buffalo chips. The cooks of the various messes were assisting each other, and the meal was ready for us about 9 o'clock. Tinkham and Burr got in just in time to partake with us, as also did Moffett and Broadwell. Mr. Moffett reported the height of the bluff or Côteau range as 702 feet above the level of Mouse river, and distant 20 miles from it; the height of the hill seven miles from the camp of to-day is 256 feet.

Seated around the camp fire between the two tents we had a very pleasant conference with our friends. I was very favorably impressed with Governor De L'Orme, and with his opinion, as well as that of his associates, in regard to their right to hunt on our territory, they being residents of the country north of our boundary line. They claim the protection of both governments, and the doubt as to the position of the boundary line makes them ignorant as to which one they have the most claim upon. During the hunting season they carry with them



Stanley del.

J. Bien N.Y. lith.

NEAR MOUSE RIVER.

their families and their property, and they consider that this territory is open to them; that the right to hunt on it belongs to them, and that their children born during this transit over our soil possess the heritage of American citizens. Strongly impressed in favor of American institutions, they wish to be noticed by our government, and feel a desire to meet and confer with a commissioner sent by it to treat with them. My own opinion is, that while they possess no fee simple in the soil, yet they have the same right and title which our government has acknowledged the Indian tribes to possess—a right of occupation, with the view of hunting, &c. With but little care our government could obtain the whole of these people as citizens, thus protecting and building up our frontier, and having in this vicinity always a controlling check upon the Indians. Already is the salutary effect of their presence visible in the entire safety, now, with which single white men and small parties can go through this country. Their virtuous mode of life; their industry and frugality; their adaptation to frontier life, all combine to render them a valuable class of people, and well worthy the attention of our government. They expressed a desire that I should represent these things to the government, and I assured them that I would do so with pleasure. Governor De L'Orme, before retiring to rest, attended to his devotions, and I have been struck with his piety and real goodness, manifested in his conduct and conversation.

CÔTEAU DU MISSOURI TO FORT UNION.

July 24.—We took a late breakfast this morning, and after parting with our guests we got off at 9 a. m. We halted for two hours at noon, during which time the hunters went out and drove a herd of buffaloes towards us, and right on the line killed two fine cows. The wagons did not have to go twenty yards out of the way to get the meat. I sent Mr. Tinkham and Paul Boilleau out to the Mouse river, which they followed some distance, as also the "River of the Lakes," joining us at camp at 8 p. m. We made $15\frac{1}{4}$ miles to-day, and the grazing to-night is excellent. From conversation with Le Bombard to-night, I think the distance to Fort Union cannot be over 150 miles. At my request he prepared a map of the country ahead, and an itinerary of the route, making it in seven journeys.

July 25.—The express started this morning at 6 a. m., accompanying the train some five or six miles. It consists of Mr. Osgood, Boutineau, Henry Boilleau, and Gray. They are to procure additional wagons or carts at Fort Union, to aid in transportation to Fort Benton. By it I sent a letter to Lieutenant Grover, congratulating him on his preceding me into Fort Union; giving him a "resumé" of our labors up to this point; informing him as to Mr. Osgood's duty, and alluding briefly to the continuance of our labors towards the mountains. I instructed him to have his report ready on my arrival, and informed him that Mr. Osgood would confer freely with him; expressing much confidence in his ability to furnish valuable suggestions, based upon the experience he must have undoubtedly acquired. I also sent a letter to Lieutenant Donelson by Osgood, announcing to him my approach, and the date of my expected arrival. I informed him that I desired his views of the mode of conducting the survey to and through the mountains, hoping that he had collected much valuable information. I also instructed him to furnish Mr. Osgood certain of the detachment of sappers, to assist in the preparation of the means of transportation. I informed him that the duty of preparing transportation was placed in the hands of Mr. Osgood, and that he would therefore turn over to him all the animals he had collected.

Messrs. Tinkham, Lander, and Paul Boilleau, went to-day to make an examination of the

Mouse river valley and the River of the Lakes. They are to look carefully for coals and iron, and to see what quantities are likely to be supplied, and join our camp to-morrow night. The road to-day was excellent, being over a rolling prairie, at times very hilly. We had but one coulée to cross, and that was very shallow and offered no impediment. We made to-day 21 miles, and found fine grass and excellent water at our camp. Lieutenant Grover's trail has crossed our route several times to-day, and passes only some twenty rods from our camp.

July 26.—We started this morning about 6 o'clock, and travelling $11\frac{1}{2}$ miles we halted on the bank of a lake. A herd of buffalo approached on the south side of this lake to drink, and crossed within gunshot on the opposite side. Some of our party fired at them, and Le Bombard followed and killed a fine, fat cow. About seven miles further on I received a letter from Mr. Osgood, by the hands of an Assiniboine Indian. The express party camped last night about ten miles ahead of the place where we camp to-night, at a large encampment of Assiniboine Indians, numbering 150 lodges and some 1,200 persons. The Indians built for them a lodge in the centre of their camp, and treated them with great hospitality. One of them offered to act as Mr. Osgood's express, and he told them that on my arrival I would have a talk with them and make them some presents. By this note I also learned that Lieutenant Grover had passed some eight miles to the east of our line, some four days ago.

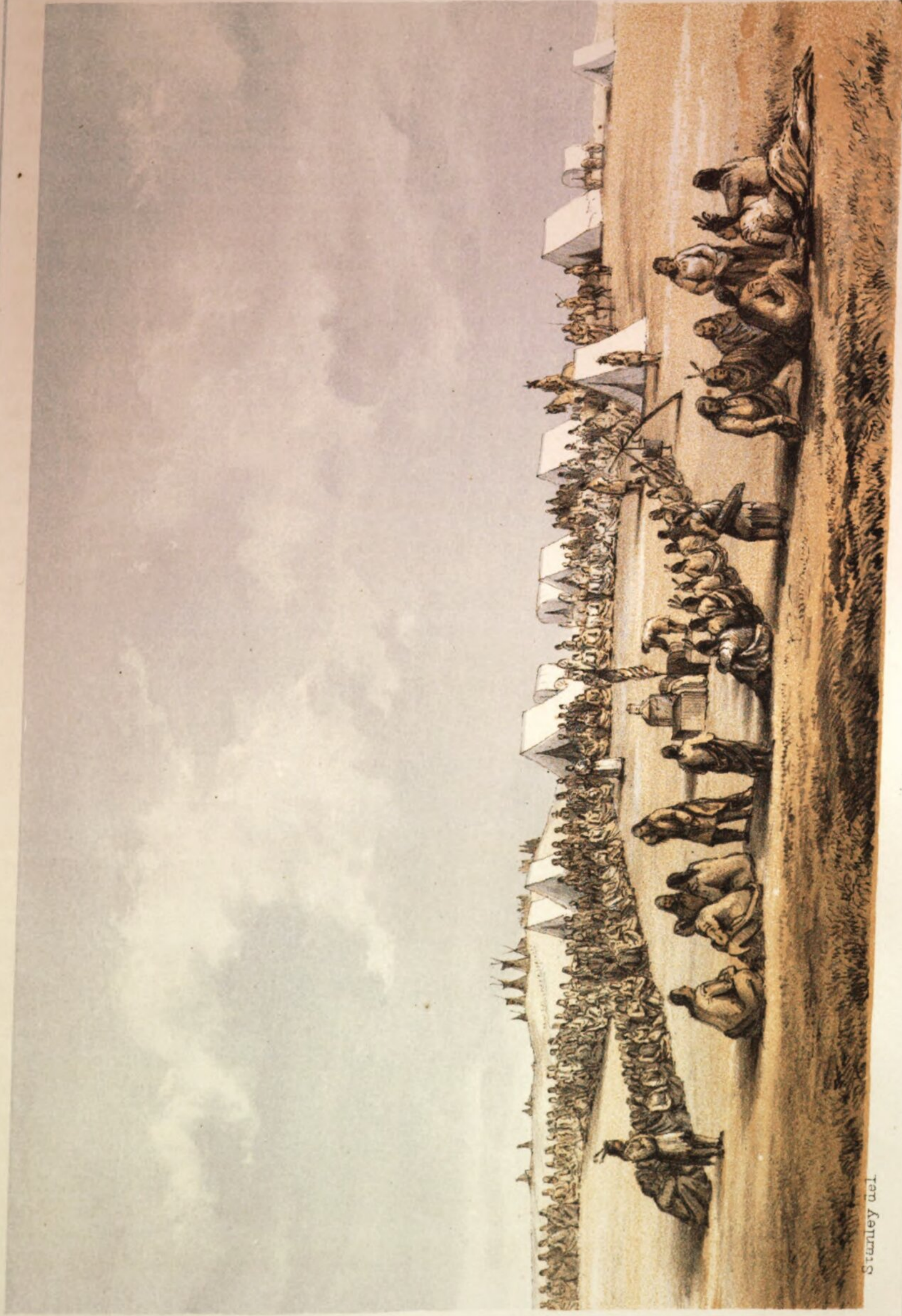
Here were four men received kindly and treated well in a camp containing 1,200 persons, and an express volunteered. I felt very grateful, indeed, to those Indians, for their kindness to my men, their proffer of kind feeling and hospitality to myself and the survey. I reflected much on the commentary thus given on the remarks constantly being made about the intentions of the Indians.

As we passed to-day an old encampment of the Indians we found numerous bundles of light wood, tied up, and as we did not expect to reach wood very soon, the men were ordered to place a lot of it in the wagons. I learned from the Indian who remained with us all night that Grover had a Sioux Indian as a guide. I determined upon visiting the Assiniboine camp to-morrow, and consequently the Indian was retained as a guide to that point. I sent Lambert and Moffett in advance some five or six miles to a high ridge, to make a reconnaissance and obtain a barometric profile.

Lander, Tinkham, and Paul returned this evening. They had made a reconnaissance of some twenty miles along the River of the Lakes, but had not ascertained its source. No information had been gained in regard to coal. I accordingly determined to have a bolder and more thorough examination made on leaving the Assiniboine camp.

July 27.—Reaching camp a little after noon, fifteen miles from last night's camp, and about a quarter of a mile from that of the Assiniboines, numbers of Indians rode out to welcome us. The first one came toward us with the back of his uplifted hand toward us, as a signal of friendship, and then they shook hands with every man of our party.

We found them to be under the command of the chiefs Blue Thunder and Little Thunder, the latter probably 36 years of age. As soon as we were encamped, they informed me that they had reserved a present of skins for me, and were making preparations to have a talk. While dinner was being prepared many seated themselves in squads around the tents, smoking with the men. One large pipe serves a dozen, and the custom adopted is to smoke a little and pass it to their neighbor, and thus go around. It is the first signal of welcome or friendship after the hand is offered, and they will have no business or other transaction previous to it.



DISTRIBUTION OF GOODS TO THE ASSINIBOINS.

One of the Indians handed me a note from Lieutenant Grover, dated the 21st, stating that he would be at Fort Union by the 25th.

After dinner, accompanied by Dr. Suckley, Messrs. Stanley, Lander, Tinkham, Everett, Evans, Adams, Menoc, with Paul Boilleau, Le Bombard and Le Frambois as interpreters, I went over to their camp, which was irregularly arranged in a sort of "corral," consisting of about 150 lodges, averaging ten persons to each lodge.

Our approach was hailed by the barking of an immense number of dogs, which they use for the drawing of their lodges, provisions, and property; applying them to sledges in the winter, they furnish the whole of their transportation when travelling from place to place.

They appeared, also, to be abundantly supplied with horses, many of which were of good quality. All the women and children turned out of the lodges as we passed, curious to see us. Frames of poles stood around, upon which skins and meat were drying. Yet, in spite of the appearance of plenty, all had a look of poverty, judging from the meagreness of clothing and the length of time it appeared to have been worn, while all appeared very filthy and miserable.

A very large lodge, about fifty feet in diameter, had been erected for our reception in the centre of the enclosure, within which we found seated two circles of chiefs, braves, warriors, and others. At the back of the lodge was arranged a long seat for us, consisting of a pile of skins, which were afterwards presented to me.

There were about eighty persons present, including our own party. During the preparation for the ceremonial reception there was a general smoking among all present, during which an old man, one of the dignitaries of the tribe, prepared the "pipe of reception," only smoked on great occasions. The stem was decked with ribbons of various colors, and when the stem stood obliquely feathers would drop down like the wing of a bird. At the lower end of this pipe, where it enters the bowl, was a duck's head. This leaned against a small stick crotched at the end, against which, turning towards the sun, the pipe stem found a support. Some sweet grass, platted, was then set on fire and used in the manner of "incense," both to the bowl and the stem. After lighting the pipe with the scented grass it was planted near by in a small hole and burned.

Preceding the smoking the bearer of the pipe shook hands with each member of our party, handing the pipe after this ceremony was over. Then a bowl of water was handed around by a second individual, who also shook hands with each one of us before we drank of the contents of the bowl. Next came the eating of a soup, made of buffalo and "cypsina," a species of turnip, which was rich and greasy but quite palatable.

Soon after this ceremony, which completed the reception, an old man advanced to me and shook hands, after which he shook the hand of each member of our company. His appearance was much in his favor, carrying himself with great dignity. With considerable fluency, and, at times, with many gestures, he addressed me substantially as follows:

"My father, the Great Master of Life made us all for good purposes. He had a design when he made me. I have not yet fulfilled his wishes; but before I die, though an old man, I hope to be able to do something for my people.

"My father, we are glad to see you here to-day to hear from the Great Father afar off, who sent you. We have never yet been taken under his protection, nor experienced his kindness. We are glad of this opportunity to show our own kind feelings towards him, and we hope the peace now commenced may last forever.

"My father, you see us now as we are. We are poor; we have but few blankets and little

clothing. The Great Father of Life who made us and gave us these lands to live upon made the buffalo and other game to afford us subsistence; their meat is our only food, with their skins we clothe ourselves and build our houses. They are our only means of life—food, fuel, and clothing. But I fear we will soon be deprived of these; starvation and cold will destroy us. The buffalo are fast disappearing and before many years will be destroyed. As the white man advances our means of life grow less. We will soon have to seek protection in our poverty from the Great Father, who can so well supply it.

“My father, we hear that a great road is to be made through our country. We do not know what this is for; we do not understand it; but I think it will drive away the buffalo. We like to see our white brothers; we like to give them the hand of friendship, but we know that as they come our game goes back. What are we to do?”

Again shaking hands with all of us he sat down, and after a short interval of silence the chief, through his interpreter, signified a desire to hear me reply, which I did, in substance, as follows:

“I am happy to meet you this day. I shake hands with you all as friends and brothers. I feel deeply grateful to you for your expression of kindness made to me this day, and for the hospitality you have shown to my party. My four men who first met you were safe, though so few among so many of you. They enjoyed your best accommodations, and a lodge was built for them to sleep in.

“I will write to the Great Father at Washington of all we do to-day. I will tell him of your kindness and good will toward his people; of your dependence on the buffalo for food and clothing. I will tell him that when you are deprived of these by the advance of the whites he should relieve your poverty. He will, I know, give you protection; he is warmly interested in you and, I am confident, will soon send you proofs of his kind consideration.”

I explained that the road to be made from the Mississippi to the Pacific would not injure the Indians nor deprive them of comforts; that whites would settle along the line, and though they would drive off the buffalo, they would also supply other articles in place of them. They would receive from the President implements of agriculture and learn to till the soil, so as to obtain food with less labor than now.

I told them that I would go through the lands of the Blackfeet and other Indians beyond the Yellowstone, carrying the friendly messages of the Great Father, and insisting on peace among all, to secure the safety of the whites. I promised to write to their good friend, General Gorman, the Indian superintendent; told them that I knew him well, that he was a good and just man, and certainly their friend.

My remarks seemed to make a very favorable impression, and were received with every mark of respect. Their approbation was shown as each paragraph was interpreted by the ejaculation “how,” a common word, answering every purpose of salutation, approval, or concurrence.

After a short conversation among themselves, the “Old Crane” came forward, and shaking hands all round, addressed me as follows:

“My father, I have heard of our Good Father to-day with much joy. I trust this will be the day of hope for the Indians, for my children, and for my grandchildren. The Father of Life made us all wish to live. I wish to live yet a good while. I wish to live for my children. You see around you our young men, our children, and our families. They are almost naked and destitute; you see them clad from the animals of these plains.

“My father, we have always been friendly to the whites since they first came into our

country; we have observed our obligations with them; we have always treated them with kindness and hospitality and we will continue to do so.

"My father, not long ago the Indians of the Missouri were called to a council at Fort Laramie; a treaty was there made, fixing the hunting grounds of each tribe. We have sacredly kept this treaty and have never gone out of our allotted lands. But the Sioux, on one side, have come into our hunting grounds. The half-breeds on the other side have hunted on our plains; we have submitted patiently, knowing, my father, that the Great Father, when he heard of these things, would do us justice. We ask you to relieve us from these troubles.

"Our good father has told us about this road. I do not see how it will benefit us, and I fear my people will be driven from these plains before the white men. My father, our hearts are good; we are poor and have not much, but as a token of our kind feelings accept those skins and robes on which you are seated."

I made no formal reply to this, but in a conversational way reiterated some of my former remarks. I added my warmest thanks for their present, and told them that we had some presents for them, excusing the small amount we could give them by the plea of the great distance we had brought them. I promised them more in future through the Indian agents, and inviting them to come to our camp and receive the gifts, I concluded the conference about 7 a. m.

The present they gave me consisted of thirty-two dressed skins and two robes.

We spent about half an hour in going around among the various lodges, and then returned to our camp, being followed by the whole encampment. During the time we were engaged in inspecting their camp they became aware of the profession of Dr. Suckley, and there was scarcely a lodge that did not contain some patient for his medical attention. Ailments which had taken place years before were complained of, though some real sickness was prescribed for. The doctor vaccinated some eight or nine, and, through Le Frambois, explained to them its object and showed them how they should do in nine days. It was near dusk when the party arrived at our camp and were arranged to receive their presents. They were seated around in the form of three sides of a square, the open side being opposite to the places occupied by our party, the chief, and higher order of the Indians. At each of the four corners was posted a brave or chief. These men never receive a gift, considering it a degradation to accept anything but what their own prowess or superior qualities of manhood acquire for them. Their hearts are so good and strong that they scorn to take anything, and self denial and the power to resist temptation to luxury or easily acquired property is a boast with them. On these men, in time of peace, when difficulties occur among themselves, the tribe relies, and in time of war they are their leaders to the scene of action. To two old men of the tribe was assigned the duty of making the distribution, and the presents were placed in the centre of the area. During the whole distribution the Indians sat in perfect silence. All seemed satisfied with the articles they received and not a grumble escaped one of them in regard to the assignment made. After this was over they returned to their camp, the chiefs and braves remaining. At about half-past eight we had a collation of coffee and bread in our mess tent, and remained till a late hour smoking and conversing. Soon after this our friends left, myself and the interpreters escorting them outside of our sentinels. I was much pleased with these Indians, and they seem to be very favorably inclined towards the whites and sincere in their professions of friendship. Nothing to-day of the slightest value has been missed, as I can learn. Their hospitality I shall long remember, and the peculiar mode of manifesting kindness this night

displayed will dwell long in my memory as one of the characteristics of the Assiniboine Indians.

The word Assiniboine has its origin as follows: They are an offspring of the Sioux. In the war of 1812 a number of these Sioux fought against a number of Chippewas, and took a good many of the latter prisoners. They tied these prisoners to a stake upon a large rock and burned them to death. Since that time they have been called "Assini Boines," which, in Chippewa language, means "burnt rock."

July 28.—It was very late this morning before we started, being occupied in fitting out a party consisting of Mr. Lander, Dr. Suckley, Burr, and Corporal Rummel, with instructions to strike the "Pierced Rock," on the Mouse river, and make a careful examination for coal and iron. They were to explore the White Earth river, and make a thorough reconnaissance of the country; examine the Côteau du Missouri, and, reaching the 49th parallel, make a detour to the northwest, and arrive at the Yellowstone in some three or four days. Mr. Burr, at his own request, was placed in charge of the barometrical observations, and I instructed him to make numerous observations of elevations, depressions, valleys, &c., to secure the best profile possible. Dr. Suckley, at his own request, accompanied Mr. Lander for the purpose of making geological examinations and such collections in natural history as the route would afford.

Paul Boilleau and Le Frambois were left at the Assiniboine camp. They were to remain here two days to collect statistical information of the traditions, habits, &c., of these Indians, and prepare a vocabulary of their language; the former, in charge of a barometer, was to bring a profile of the line he pursued to the Yellowstone.

July 29.—The road to-day for about 20 miles was over a fine country, nearly level, with a marsh on the left, and beyond it two bluffs about 150 feet high. The last three miles was over a hilly, broken country, encamping on the bank of a small branch of Muddy river, near its source. Tinkham, Lambert, and Adams were sent out to sketch in the neighboring country; the former to go to the head of White Earth river and connect our route with Landers'. The two latter returned and reported the country good for grazing, with abundant water in ponds and streams—one pond being eight miles in circumference. The condition of our animals, as reported by Mr. Kendall, is so far excellent, and we have certainly achieved a triumph in making our first 700 miles with so little injury to them.

July 30.—Mr. Tinkham returned this morning from an examination of White Earth river; no special matter of interest observed, except that the country was of the same general character as that passed over by the main train. The country throughout to-day has been rolling and hilly, with stony knolls. At 18 miles from camp we crossed a small tributary of Muddy creek, 15 feet wide and 2 deep. Scattered trees are to be found in the coulées near this stream. Several dry water courses were passed in the course of the day, which probably, in the times of freshets, are occupied by brooks connecting with Muddy creek. Camp, water, and grass good, but no wood. Distance made to-day $23\frac{1}{2}$ miles.

July 31.—Before light an Indian arrived in our camp, bringing the intelligence that Mr. Culbertson was some distance to the south of us, somewhere on Muddy river, with a wagon and four men, sent out by Mr. Osgood to meet us. Our guide assuring us that he thought we could not be over sixteen miles from Fort Union, I sent Mr. Tinkham out to say to him we would go into Fort Union that night, and they need not go out of their way to meet us, as we would see them there.

Started at 8 o'clock. Our noon halt was made on Painted Wood creek, $10\frac{1}{2}$ miles from our



Stanley del.

J. Bien N.Y. lith.

FORT UNION AND DISTRIBUTION OF GOODS TO THE ASSINNIBORNS.

camp. Here we were joined by two Indians of another Assiniboine camp, on their way from the north to Fort Union to get tobacco, &c.

About 16 miles of to-day's march was over a most excellent, hard, prairie road, of gradual but steady ascent, when it began to assume the appearance of a rolling country, much broken up, in advance of us.

When our odometer indicated we had made $20\frac{1}{2}$ miles' march, being at a good camping place, although our two guides recognized two hills which marked the position of the Yellowstone, and thought them only about six miles off, we went into camp. We were soon joined by Tinkham, who had found the trail, but could find nothing of Mr. Culbertson's party. Kendall went out two or three miles to the eastward, and came back with the intelligence that he had crossed the trail, and seen indications that the wagon had gone and returned over the same trail. There is here a great scarceness of buffalo chips, which were destroyed by fire last spring. I ordered the breaking of two or three boxes and the issue of pemmican, and sent off Le Bombard to the fort for flour, sugar, and a slight indulgence for all hands. The evening was spent in studying maps, dictating for the journal, reviewing the ground passed over, and in regard to future plans. Le Bombard had not returned, and no persons out from the fort. This indicates pretty clearly that our guides' estimate of distance was again out of the way.

August 1.—We were aroused by the arrival of Le Bombard and two voyageurs about 4 o'clock, they having spent all night on the prairie. Donelson came out to meet us; Grover also; and reported it at least ten miles to Fort Union. They brought us news from Fort Union of the death of sapper White, by accidental discharge of his gun in his own hands. Made an easy march for about twelve miles over rolling prairie. Boutineau came out to meet us; afterwards Osgood and Graham.

Two miles out, at junction of beaten road, the line was formed, I taking my horse for the first time since our anticipated meeting with the Sioux. About half a mile further we came in sight of Missouri river, and the whole party gave three cheers as its beautiful bluff banks, dotted with timber, came in view. As we rounded the hill cutting off view of Fort Union, Grover came up, and was received with three cheers. On the coming out of Lieutenant Donelson and Mr. Denig, in charge of the post, I ordered a volley of the small arms of our command, to express admiration of his first arrival. This was answered by a salute of 13 guns.

We pitched camp $16\frac{1}{2}$ miles from the camp of last night, and soon after there was an assembling of the whole party at my tent. I congratulated them on the zealous performance of duty, gave them a cordial invitation to go on, and whatever their determination, even should they leave us here, promised them an honorable discharge. All seemed desirous of going on, and not one availed himself of the opportunity to leave the expedition.

By the great vigilance exercised on the march the animals had been constantly improving, gaining flesh and becoming cured of sores; so that, though we started from the Mississippi with forty disabled animals, all but one were serviceable on our arrival at Fort Union.

Lieutenant Grover, on leaving us at Pike lake on the 25th June to pursue a more southerly route to Fort Union, crossed the two forks of the Chippeway river, and fifteen miles south of the route of the main train, where he found them each of about the same size, viz: thirty yards wide and six feet deep, with unwooded shores, sandy bottom, and a velocity of about four miles an hour. After passing the second (Pomme de Terre river) no stream is met with as far as Lake Traverse, 47 miles in a direct line.

The prairie gradually changes its character and becomes by degrees less rolling, until after

going fourteen miles and passing the "Moose Island lakes" it becomes almost a dead level, quite soft, and in some places marshy, without a tree or twig in sight the whole distance of 33 miles to the foot of Lake Traverse. Towards the north this flat region is bounded only by the horizon, but to the south, at a few miles distance, it gradually rises, becomes rolling, and is again filled with small lakes, which sometimes discharge their waters into streams running to the southwest.

Lake Traverse is a beautiful sheet of water, twelve miles long and from two to three wide, studded with a few small islands; its water level sixty or seventy feet below the general level of its banks; these are quite abrupt and cut by deep ravines branching in every direction, and drawing the surface water of the vicinity into the lake. Wood is scarce at the lake, probably from its destruction by the Indians and by prairie fires.

Rabbit river discharges into it about three miles from its foot, being there ten yards wide, with a rapid current and rocky bottom.

The Bois des Sioux, which forms its outlet, runs a few degrees east of north, and with a slow current, not exceeding a mile an hour, forms one of the principal branches of Red river. Lieutenant Grover followed it down for twenty-two miles, and found it to vary in width from forty to over a hundred yards. Its bottom is sandy, and depth not more than four feet. In ordinary stages its water is nearly flush with its banks, but in floods it overflows the bottom for a mile in breadth.

He crossed it only three miles higher up than the crossing of the main trains, and again diverging from our route in a direction a little north of west, crossed a "scarcely perceptible" divide, and struck the Wild Rice river where it makes a wide bend near a tract of sand hills called "Lightning's Neck," which spring up abruptly from the level plain, and cover several miles of area. He crossed the Wild Rice thirty-five miles from the Bois des Sioux, where it is only fifteen yards wide and four feet deep. Thence to Jacques, or James river, fifty miles in a direct line, extends a gently rolling prairie, with some high sandy divides and rocky ridges near its centre, among which the most prominent is "Dead Colt Hillock."

James river, which flows into the Missouri, is near the mouth of "Grisly Bear" creek, a clear, sluggish stream, averaging forty-five yards in width, five feet deep, and with a hard clay bottom. It takes a sinuous course through a rich valley from one to three miles wide, and in parts subject to overflow. The "Grand Côteau," or dividing ridge between James river and the Missouri, may be regarded as divided into two terraces; the first, with a general level about ninety feet above James river, having a very gently rolling surface, so that the second terrace may be seen above it at a distance of thirty or forty miles. There are but few streams, some of them becoming dry and nearly all the water being collected into little ponds, many of which are never dry. The soil of this lower terrace is harder and drier than the prairies previously passed over, and contains more gravel. This terrace is fifteen or twenty miles wide, and is then succeeded by the second, a broad expanse of broken country, irregular in outlines. Sections of it are merely high and rolling, with sometimes an extended level plateau; other parts rising in abrupt peaks of no great height, or again in long bare ridges. Small lakes are numerous, some of them salt.

Skirting this high terrace for fifty-two miles he reached the head waters of Shaysenne river, and soon after Mouse river, 180 miles northwest of where he crossed the James, and at our camp of July 20, whence to Fort Union his course coincided very nearly with ours.

Lieutenant Donelson's party for the survey of the Missouri consisted of Lieutenant John

Mullan of the army, Mr. W. M. Graham, astronomer, one sergeant, two artificers, and three privates of the corps of sappers and miners. Lieutenant Mullan was placed in charge of the meteorological observations, and also assisted in making the topography, Serjeant Collins aiding him in this branch. The steamboat "Robert Campbell," in which he engaged passage, was propelled by a double engine, and had been a first class Missouri river packet. Her tonnage was about 300, and she had on board the maximum load, drawing about five feet of water.

The plan of making the survey was as follows: Meteorological observations were taken usually at every halt, and astronomical whenever practicable. A topographical sketch was made from a point about twenty miles above St. Joseph, Missouri, upwards, for which purpose he, with Lieutenant Mullan and Sergeant Collins, alternately performed the work of running courses, estimating distances, and mapping.

Hourly soundings were taken from near the mouth of the Big Sioux to Fort Union. Notes were made of all the features of the river and adjacent country, as observed from the steamboat, and all information practicable was obtained from gentlemen of the Fur Company, traders, and voyageurs.

The boat travelled by night as far as St. Joseph's, and omissions in that part of the survey were thus rendered necessary, which, in the maps, are supplied from the surveys of Nicollet, Lewis and Clark, and others.

Owing to the loss of part of his notes on the way from Olympia to Washington he was unable to give the soundings made above the mouth of the Big Sioux.

The following is the substance of Lieutenant Donelson's description of the Missouri from St. Louis to Fort Union:

Below the mouth of the Kansas its banks are almost continuously settled, while all the more prominent localities are occupied by flourishing cities, towns, and villages. The soil is of surpassing fertility, and the adjacent country rich in coal, iron, and other minerals. Cottonwood is the prevailing growth in the bottoms, while willow is very abundant at the water's edge, and sycamore in the higher bottom lands; but there is also found abundance of oak, walnut, ash, maple, elm, and many other trees, principally on the slopes of the immediate valley of the Missouri. The average velocity of this portion of the Missouri is a little over five miles an hour. It results from the continually recurring changes to which the Missouri is liable that at nearly every bend there is a sand bar or island, and a series of snags and sawyers. These also generally occur wherever from any cause the water is still or there is a counter current, and where there are eddies or whirlpools. The difficulty in navigation is to discover in season an unobstructed channel. Concealed snags and sawyers are liable to occur in any part of the river.

The two ranges of hills which limit the valley are from seven to fifteen miles from each other, the river flowing alternately from one to the other in its winding course. Prairie occurs on the banks at only one or two places, the rest being heavily wooded. In many instances the bottoms may be said to be swamp land, being occupied by numerous marshes, lakes, ponds, and sloughs.

The permanent obstructions in the river below the mouth of the Kansas are a chain of rocks, about twelve miles below St. Charles, and one a little below Sibley. He could obtain no facts as to the effect these now have upon navigation; but they are doubtless of little importance. The river is open all the year as high as Boonville; above this, to Council Bluff City, there is sometimes a month in winter when it is closed with ice.

From the Kansas up to the mouth of the Platte the two ranges of hills which limit the valley continue to be from seven to fifteen miles from each other, and are from seventy-five to two hundred and fifty feet in height.

The timber on the banks diminishes in quantity from Fort Leavenworth to near the Platte. While the hills are thinly wooded with oak, elm, and ash, and the river banks skirted by a belt of cotton-wood and willow, varying in width from a few hundred yards to two miles, the space between this belt and the foot of the hills consists of prairies that are level and bare of timber. Ponds, sloughs, and marshes continue, but to a less extent.

Above St. Joseph the steamboat ceased to travel at night on account of the increased difficulties of navigation; but this necessity will be obviated when the dangerous obstructions are removed and a more thorough knowledge of the river gained.

Opposite St. Joseph the growth was observed to consist of cotton-wood, elm, ash, box-elder, maple, basswood, mulberry, dogwood, and oak. By rough measurement, the width of the river just above St. Joseph was four hundred and sixty yards, and the velocity of the current three miles per hour; but this appeared much less than near the left bank, where was the main channel. The tortuous course of the river here is shown by the fact that the distance from Weston to St. Joseph by land is twenty-eight miles, by water sixty. Above this it is straight, and widens to from seven hundred to one thousand yards.

From the Platte to Fort Pierre the distance on the river is, according to Nicollet's maps, 638 miles. The banks of the river might be almost continuously settled as far up as the north of L'Eau qui Court. Above this point some twenty-five per cent. of them are available; and in the whole distance the valley gradually becomes less fertile. The river varies in width from four hundred to a thousand yards, and the shoals and rapids (of which there are eight between the Platte and Sergeant's Hill) make that portion of the river up to the mouth of the Big Sioux the most dangerous for navigation. Above the mouth of the Sioux the current became much more rapid, and the crew were compelled to "cordelle" the steamboat for about half a mile.

From Fort Pierre to the White Earth river obstructions are comparatively few, and navigation safe; although having partially unloaded at the fort, the ease and speed of travel were increased, and the boat now drew but $3\frac{1}{2}$ feet of water. Above the White Earth the river has an exceedingly tortuous course, and is impeded by an unusual number of snags and bars.

At Fort Pierre the bluffs are about four miles from each other, and equally distant from the river. There are many points suitable for settlements, having a tolerably rich soil and producing fine grass. The banks are in many places well timbered with cotton-wood and a little ash; cedars occur in small numbers in the ravines. This tree, first seen near the L'Eau qui Court, becomes very important on the Upper Missouri, as it grows where other kinds will not, and furnishes the best of fuel, as well as very durable timber. Several islands are covered with it, and named from that circumstance. Timber of all kinds is quite insufficient for the supply of steamboats, and on several days it was necessary to use the remains of abandoned trading posts.

The width of the river varies from one hundred and fifty to three hundred yards; at Fort Union it has been found to be three hundred paces wide, crossing on the ice in winter. Great bends occur near Forts Pierre and Berthold; the first eight miles across and twenty-five around, the second twelve across and forty around.

At Fort Clark the Indians cultivate, with tolerable success, corn, and some vegetables. At Fort Berthold and above the bluffs rise to one hundred and fifty and three hundred feet, bare of vegetation; and from the variety of colors imparted to them by the red clay, lignite, and a

white substance they contain, present a picturesque appearance. They sometimes have quaint forms, reminding one of old towns and castles seen at a distance. They are often called by the traders "Mauvaises Terres," on account of containing quagmires filled with clay, covered with a white incrustation, which gives the surface a firm appearance.

Lieutenant Donelson went up in the Robert Campbell to a point about seven miles above the mouth of the Poplar, where difficulties from sand bars were encountered, which he thought could have been overcome. But the managers of the boat thought it best to return from that point, and therefore carried ashore the freight for Fort Benton, which was to be conveyed there by cordelling a large keel boat. In descending to Fort Union again the boat travelled with nearly three times the speed made in ascending, and no material obstructions were met with.

Wood was more abundant than below Fort Benton, chiefly cotton-wood and willow.

The Robert Campbell was forty-two days ascending to Fort Union, and about seventeen in returning to St. Louis. The round trip, however, has been made in forty-four days, and, with suitable boats, could be made in even less time. The same steamboat can easily perform in one season four round trips from St. Louis to Fort Union.

Lieutenant Donelson and his party, before our arrival at Fort Union, had made an exploration of the country north of Fort Union, between Big Muddy and White Earth rivers. Leaving artificer White at the fort to make meteorological observations and take care of the property, the remainder, twelve in number, left on the 12th of July, and travelled north-northwest up the valley of the Little Muddy for a distance of 42 miles, in a direct line from the fort; then, with a general direction easterly, crossing the heads of the Big Muddy to the head of the White Earth, 75 miles east of the Little Muddy; and following it down for thirty miles, left it and crossed the country westward, on a line nearly parallel to the Missouri, to Fort Union, 62 miles to the west. The distance travelled, as estimated, including the sinuosities of the route, was two hundred and thirty-five miles, or twenty-six miles more than as above stated. He thus explored a tract from twelve to twenty-five miles on each side of our route, which passed nearly half way between his two lines of survey in going out and returning.

He gives the following account of the country: It may be characterized as a vast plain, destitute of timber, covered with boulders and pebbles of granite, limestone, &c., broken towards the north by innumerable hillocks, between which are ponds, and towards the south intersected by the branches of the Missouri. At the heads of the Big Muddy and White Earth is the most elevated part of the ridge or terrace, called the "Grand Côteau," appearing at a distance of six miles like a "distant shore," about a hundred feet high, but the ascent was so gradual as to be imperceptible. A considerable depression in the country occurs in the valley of the Little Muddy, by which this Grand Côteau can be passed around.

All the streams are small and can be of no value for navigation; they are also liable to very high freshets. A chain of sand hills occurs about thirty-two miles northwest of Fort Union, and is covered with a thick growth of small willow. Near the head of Miry river is an outcrop of lignite, like that in the Missouri.

I may here make a general review of the country on the route travelled by us since reaching the Bois des Sioux.

The whole distance from St. Paul to Fort Union by our route is, by odometer measurement, 715½ miles, and we had accomplished it since June 8, the day the baggage train left Camp Pierce, or in 55 days, and, excluding halts from time to time, 7 days, in 48 travelling days. The rate of travelling was therefore about 15 miles a day, most of the way over a country

almost unknown, without roads, and with such an imperfect knowledge of the distances to be made between camps as to cramp our movements much more than if the route had been measured and itineraries constructed for our use.

The Bois des Sioux, at the point of crossing, twenty-five miles below its source in Lake Traverse, is 70 feet wide and four to seven feet deep, the soil rich on its banks, and beyond it for eleven miles, to Wild Rice river, extends a smooth, flat prairie. This stream is 40 feet wide, and skirted with elms. Thence a smooth prairie extends to Shayenne river; sand knolls, ponds, and marshes frequent as the river is approached, but not injuring the nature of the road. The Shayenne is 60 feet wide and 14 deep, being the largest branch of Red river crossed by the train, and resembles the preceding stream, except in the smaller amount of timber and the greater depression of its valley below the general surface.

Forty-five miles south of this place, and near the head of Lake Traverse, commences the elevated ridge called the "Côteau des Prairie," which forms the first of the high barren ridges separating the branches of the Missouri south of the proposed route, and rising 2,046 feet above the sea level.

The route across the bend of the Shayenne leads over higher and drier prairies, with still less wood and water, for 85 miles; not a tree in sight for intervals of 20 miles, and the surface becoming more broken with deep "coulées and ravines" towards the second crossing of the river, which is here only 50 feet wide and three or four deep, flowing some 150 or 200 feet below the general level, and with steep bluffs on the sides. The valley is half a mile wide and the shores wooded. Salt grass and deposits of salt present themselves on the way, and numerous small marshes and ponds intersect the road, but form no serious obstacle.

Near the Shayenne considerable limestone occurs, and in many places the ground in the vicinity and incrustation on the stone indicate the presence of iron, probably decomposed pyrite. All difficulties in this part are avoided by the line passing south of the Shayenne, as already mentioned, where traversed by Lieutenant Grover.

The country now assumes a bolder character; the swelling surface takes the form of terraces and ridges; ponds and marshes occur more frequently; timber disappears from the uplands; the prairie becomes gravelly and abounds in granite boulders; and the river itself, moderately fringed with wood of different kinds, flows through a deep intervalle, enclosed by sand and clay bluffs from 150 to 200 feet high, which are again surmounted by occasional hills sufficiently conspicuous to serve as landmarks to the hunters, and associated with thrilling reminiscences of Indian story.

This forms the lower terrace of the dividing côteau, as described by Lieutenant Grover.

After leaving the Shayenne at its second crossing, the country becomes still more elevated and undulating, with less water, and for ninety miles not a stick of wood. The general elevation of the surface still does not rise much above fifteen hundred feet, and forms a terrace from which rise the waters of Red river and Jacques or James river, a branch of the Missouri. Southwest of this the second terrace or côteau bordering the valley of the Missouri rises much higher, broken and irregular in outline and again full of small stagnant ponds, many of which are salt.

The route selected here approaches that of the main train, crossing James river fifty miles further down, where there is a little wood on its banks. But from here to Mouse river Lieutenant Grover found, for one hundred and eighty miles, "not a particle of any kind."

Lake Jessie and others along this route are salt, some only slightly brackish, and the theory

for their saline qualities is found in the fact that they never are washed out, and retain the salt deposits and incrustations. Sometimes two lakes, hardly twenty yards apart, differ entirely, one being so saline that the water is offensive, the other excellent, having a free and constant outlet.

The "Butte de Morale" is a prominent landmark, rising two hundred and eighty-two feet above the Shaienne river, near its source. Not far west of this the camp of July eighteenth was beautifully located on a range of hills nearly surrounded by salt lakes, though an excellent spring near by furnished an abundant supply of cold fresh water. Here wood was found for the first time after leaving Lake Jessie, ninety miles back. Near Mouse river salt marshes were passed, and in some places deposits of salt a quarter of an inch thick.

The configuration of Mouse river valley, as well as of its tributaries, resembles that of the Shaienne. High ridges divide the plateau bordering the stream, from that extending into the prairie, with coulées intersecting it and opening into the river on the one side, gradually growing imperceptible as they make into the prairie on the other. The general course of the river, and of its principal branch, the Riviere des Lacs, is nearly parallel to that of the Missouri, for the distance we followed it, of eighty-seven and a half miles to its source, and separated from that river by the "Plateau du Côteau du Missouri," varying from thirty-five to fifty-five miles in width. Many of the "coulées" reach to the edge of the Missouri plateau, and in the examination for a good passage for the wagon train secluded spots were found where battling crag and winding stream, venerable trees and greenest sward combined in scenes of much picturesque beauty.

Its valley is from half a mile to a mile wide, about two hundred feet below the prairie level, and is well wooded with maple, oak, ash, and elm. The deep coulées run back from it for fifteen or twenty miles, and must be avoided by keeping far from the river itself. They usually contain a stream of good water, and sufficient timber on the banks for camping purposes. One of the bluffs of the côteau, twenty miles from Mouse river, was found by Mr. Moffett to be seven hundred and two feet above its level, and a hill seven miles from camp rose to two hundred and fifty-six feet.

The distance from Mouse river to Fort Union, as travelled, was $118\frac{1}{4}$ miles. The route crosses the Grand Côteau, a collection of high, strong and barren knolls, with great numbers of small ponds lodged between the hills. Scarcely any wood is to be found, except a little on White Earth river and its branches; but as water and grass are usually plenty this ridge will become a good grazing country. The general elevation is between 2,000 and 2,500 feet, and it descends again at the Missouri (Fort Union) to 2,019 feet.

In ascending along the Riviere des Lacs the côteau appears to decrease in elevation until blended insensibly with the rolling prairies rising from that river. On the approach to these high prairies from the valley the swelling outline assumes the appearance of a distant coast, which seems to rise in a direction parallel to the route of the traveller, and suggests the idea of a plateau or bench of table land beyond; hence the use of the word "côteau." But this appearance has proved so frequently deceptive that only a thorough exploration can be relied upon.

North of the plateau an admirable reconnaissance by Mr. Lander develops a low, marshy prairie, extending, with little variation of surface, to the head of Mouse river, beyond the forty-ninth parallel; returning from which river to Fort Union the plateau is found declining to a wide valley or coulée, connecting almost directly with the Missouri, in a southwest direc-

tion, offering a good chance to turn the côteau, in an engineering view, and becoming thus another important key-point on the railroad route.

The plateau between Missouri and Mouse rivers cannot be called simply a rolling prairie, though in detail resembling the hilly prairies noticed, but in a very exaggerated degree, having a general similarity of outlines, an absence of wood and rocks in place, boulders plentiful, ponds and marshes, if possible, more frequent; but the elevations are so much greater as to form considerable hills and ridges several hundred feet high, and become still more rugged on the approach to Fort Union, where it ends abruptly on the level interval of the Missouri. It is intersected by numerous water courses, which are dry in summer, showing the same character of sandy and clayey soil in the bottoms, which is also seen in the rain-worn sections of the most elevated points. Vegetation is generally scanty on this plateau; grass is rank in the bottoms, but mostly thin and inferior for grazing; the prickly pear begins to appear, and a kind of wild turnip is found in comparative abundance, being the only useful production yet known, and the food of the wandering Indians, by whom it is regularly gathered.

On his arrival at Fort Union Mr. Culbertson despatched an express to Fort Benton with presents and tobacco to the chiefs of the Blackfeet nation, and the following message from me:

"I desired to meet you on the way and to assure you of the fatherly care and beneficence of the government. I wish to meet the Blackfeet in a general council at Fort Benton. Do not make war upon your neighbors. Remain at peace and the Great Father will see that you do not lose by it."

Mr. Culbertson had informed me at St. Louis that for one entire year he was enabled to restrain the Blackfeet from making war upon their neighbors, and he believed that he could have done so still longer had they shared in the liberality of the government. But his efforts proved unavailing; for they said, in answer to his appeal, "Why should we cease to make war? It is the only chance we have of receiving a portion of the goods and presents distributed among the Indians."

Fort Union is situated on the eastern bank of the Missouri river, about — miles above the mouth of the Yellowstone. It was built by the American Fur Company in 18—, and has from that time been the principal supply store, or depot, of that company. It is framed of pickets of hewn timber, — feet high, and has two bastions, one at the northwest and one at the southeast corner. The front, or main entrance, is on the side opposite the river. This fort is probably 250 feet square. The main buildings, comprising the residence of the superintendent and the store, are on the front, or eastern side. They are two stories high, and built of wood. The shops and dwellings of the blacksmith, the gunsmith, the carpenter, the shoemaker, the tailor, and others, are of adobe or wood, and occupy the other sides. These mechanics are mostly French half-breeds, and have half-breed or Indian wives, and many children. There is a grassy plain around and near the fort, extending to the base of the rising ground, which is a full mile distant on the eastern side. The Assiniboines, the Gros Ventres, the Crows, and other migratory bands of Indians, trade at this fort, exchanging the skins of the buffalo, deer, and other animals, for such commodities as they require. Mr. Culbertson, who has occupied the position of chief agent of the company during the past twenty years, has under his supervision not only Fort Union, but Forts Pierre and Benton also. He is a man of great energy, intelligence, and fidelity, and possesses the entire confidence of the Indians. His wife, a full-blood Indian of the Blood band of the Blackfoot tribe, is also deservedly held in high estimation. Though she appears to have made little or no progress in our language, she has acquired the

manners and adapted herself to the usages of the white race with singular facility. Their children have been sent to the States to be educated in our best schools.

From the second to the ninth day of August we were closely occupied in preparing for the continuation of the survey westward of the mountains. The hands were occupied in making Pembina carts, and additional transportation was purchased of the Fur Companies. Our experience thus far had shown how well adapted ox-trains were to transportation, and accordingly two additional teams were added at Fort Union. In all these arrangements both the Fur Companies zealously co-operated, placing at my disposal not only all the animals they could spare, but guides, hunters, and their information in regard to the country. We were much pleased and were much benefitted by the good offices of the Indian women at the two posts, the wives of the factors and officers of the companies, who fitted us out with a good assortment of moccasins, gloves, and other guards against the severity of the weather in the fall and winter. On the 5th of August Mr. Lander reached Fort Union, from his reconnaissance of the River of the Lakes, Côteau du Missouri, and the upper waters of Mouse river. This reconnaissance was a very extended one, and enabled me to report as to the source of the River of the Lakes, the character of the côteau in the vicinity of the 49th parallel, and the most favorable lines for crossing it and descending to the valley of the Missouri. He found lignite on the River of the Lakes, and in his trip was brought in contact with several bands of Indians, who, although somewhat uncertain and even hostile at first, became entirely satisfied with the operations of his party, and offered no obstruction to his progress.

I have referred to the fact that on my arrival at Fort Union not a man desired his discharge, although every man was offered an honorable discharge who desired to be relieved from duty at that point. The men, however, became in a few days exceedingly alarmed as to the difficulties to be expected from snow in the westward journey. The voyageurs belonging to the Fur Companies' posts thought it a good practical joke to spread bugbear stories about the immense snows to be expected early in the season, and many of the men got to believe that they would find snow knee-deep before they reached Fort Benton, and that it would be twenty feet deep in the passes of the Rocky mountains in October. Fortunately I had with me some books of travel in that country, particularly De Smet's Oregon Missions, and I had carefully, to the best of my ability, investigated the climates of the country west of the Rocky mountains. Mr. Culbertson and the officers of the companies also gave me reliable information in reference to the lightness and the lateness of the snow this side of the mountains, and I therefore found but little difficulty in satisfying my men that they had been trifled with in this matter. There were also some little differences of rank between two of the military gentlemen, growing out of a mistake of my own, soon after leaving the Mississippi, which were adjusted on terms most honorable to both, and in the most satisfactory manner to myself.

On the 7th of August there was a distribution of presents to the Assiniboinés, at which I was present. I now took a deep interest in the welfare of these Indians, from their kind treatment of my party at their camp before crossing the Côteau du Missouri; and I took this occasion to give my mite in the way of cultivating friendly feelings on their part towards their own agents and the government of the United States.

The same day the steamer St. Ange arrived from St. Louis, bringing some supplies from the quartermaster's department, and giving a most favorable opportunity for the return of such of the hunters and guides whose engagements expired on their arrival at Fort Union. I determined to send the quartermaster and commissary clerk, Mr. Everett, to Washington, by this

steamer, to report in person as to the progress of the expedition. I did not think he was strong enough to encounter the fatigues and hardships of the remainder of the journey, and I therefore deemed his return a matter of necessity.

Mr. Stanley, the artist, was busily occupied during our stay at Fort Union with his daguerreo-type apparatus, and the Indians were greatly pleased with their daguerreotypes. The scientific parties were also diligent in making their observations. As I have before observed in a former part of this narrative, I had suffered greatly from debility on the route, and I determined to make my arrangements so that I should be relieved from much of detail duties. I was anxious to cover as much of the country as possible, and determined to organize two parties to explore the country—one party, under Lieutenant Donelson, to pursue the general course between the Missouri and Saskatchewan towards the Cypress mountains; and the other, under Lieutenant Grover, to continue on the usual travelled wagon road, *via* Milk river, to Fort Benton. The supposed point of separation of the two parties was the Big Muddy river, and it was determined that the final arrangements should be made at that point. Accordingly, on the 9th of August, both Lieutenant Donelson and Lieutenant Grover's parties started, and I remained behind until the following day to settle my accounts and to complete my arrangements generally with the companies. Dr. Evans had not yet arrived from his examination of the Mauvaises Terres, and I left a letter for him, expressing my strong desire to meet him at Fort Benton. An expressman, whom I had despatched to Fort Benton on the 6th of August, with a letter of instruction to Lieutenant Saxton, was, unfortunately, obliged to return, in consequence of the loss of his horse and some difficulties he experienced with the Indians, and I concluded not to despatch him again until my arrival at the Big Muddy.

FROM FORT UNION TO FORT BENTON.

I started on the 10th from Fort Union at about twelve o'clock, followed by a war party of the Blackfeet, consisting of twenty Blood Indians and forty Piegan Indians, who arrived at Fort Union on the 8th instant on a visit to my party, and with whom I had had the most friendly interchange of civilities. I desired their company for two or three days, in order to impress them fully with the beneficent policy of our government towards the Indians, and with the peaceable character of my own duties and objects, intending then to despatch them on their way to their several tribes and to make generally known to the Blackfeet nation our objects in passing through their country. I camped that evening with Lieutenant Grover on the Little Muddy river, when, towards night, a serious difficulty came near happening between them and our party. Mr. Culbertson and myself, however, succeeded in arranging the matter, and we spent a most interesting evening with the principal men in conversing about the Blackfeet and the Indian policy of our government. On this occasion I presented the subject of a general council, to be held at Fort Benton the ensuing year, to make peace between the Blackfeet Indians and the hunting tribes west of the mountains, and to preserve peace with the white children of the Great Father. On this occasion, as on previous occasions, Mrs. Culbertson, a native of the Blood tribe of the Blackfeet, was unwearied and efficient in her good offices.

The next day, being the 11th of August, I reached the Big Muddy river. The crossing of the Big Muddy was a somewhat difficult ford, and we were all highly gratified with the zeal and efficiency of one of the Blackfeet, who pulled as steadily at the rope as any man of my party. Lieutenant Grover arrived the next day, and on this and the following day, after much reflection, I determined to change the programme that I had decided upon at Fort Union. There

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COUNCIL WITH "WHITE MAN'S HORSE."

were difficulties in the way of organizing properly two parties, providing each with the necessary number of hunters, guides, and spare horses, and I became satisfied that no good result would follow from sending a large party along the general line of the divide between the Missouri and the Saskatchewan. It was obvious to my mind that everything desired could be accomplished by occasionally sending small detached parties off the line, if we pursued the route of the Milk river with the whole party. Accordingly, the whole command was brought together at the Big Muddy, Lieutenant Donelson put in charge of the camp and march as executive officer, and the other gentlemen assigned to duty in their respective fields. I relied upon Mr. Lander and Mr. Tinkham to make examinations off the route, in connexion with the line of the main train, in order to exhaust our knowledge of the adjacent country in reference to the question of railroad practicability, and Mr. Grover could be availed of in charge of detached parties. Before leaving the Big Muddy I had much conversation with the "White Man's Horse," the chief of the war party of Blackfeet which has been alluded to. He had frequently visited the Bitter Root valley and stolen horses from the Flatheads. He observed "I take the first Flathead horse I come across; it is sure to be a good one." He and one of his men had just returned from the Flathead country and they gave a very favorable description of the route, assuring me (pointing to my wagons and Pembina carts) that there would be no difficulty in taking them through the mountains. They left the Big Muddy with us and moved ahead of us to carry the news of our coming to their brethren. I now sent forward my express to Fort Benton, with instructions to Lieutenant Saxton, and letters from Mr. Culbertson to the officers at the post at Fort Benton, to have animals and everything arranged against our arrival. The country between Fort Union and this point (the Big Muddy) is broken and rolling, with occasional formations of the *mauvaise terre* and outcroppings of sandstone. The country is well grassed for all purposes of voyaging, and there are many tracts and swales of land on and in the vicinity of the Little Muddy well adapted to cultivation. On the Big Muddy there is quite a large and open valley of a very good soil and excellent grass, with a heavy growth of cottonwood near its junction with the Missouri.

Whilst encamped at the Big Muddy Mr. Stanley examined some buttes opposite our camp, and made some sketches, one of which deserves more than a passing notice. On the top of a butte jutting out from the main plateau he found what at first appeared to be a drift of saw logs, but which, on examination, proved to be a sandstone formation, lying out full upon the surface, resembling regular cuts of round timber. They were disposed in two parallel lines, running east and west. The most southerly contained thirteen lengths, besides several displaced pieces; the length was from one to six feet. Embedded in these stone logs were small particles of oxide of iron, the size of buckshot. On the butte he gathered several much larger specimens, many as large as canister shot.

Other buttes in this locality are composed of clay, surmounted by a stratum of sandstone, varying in thickness from one to six feet, in many places discolored by iron, and showing distinctive evidence of the action of fire.

Half a mile further north there was a similar formation, where the logs were much larger, being three feet in diameter, but were less regular in their disposition. The butte was washed into gullies, by which many pieces were displaced, being piled with square blocks into irregular heaps.

On starting from the Big Muddy on the 14th of August the command was in the most excellent condition and spirits. Two of the mule teams were strengthened by an additional pair of

mules, and the wagons were somewhat overloaded, for I determined to take nearly all my provisions at the depot at Fort Union along, so that there should be no possibility of suffering for want of food, even though the depot of provisions in the Bitter Root valley had not been established by Lieutenant Saxton. We made $11\frac{1}{2}$ miles, and encamped at a most beautiful point, in the midst of luxuriant grass. The day had been very sultry, some rain fell, and one ox died from the heat.

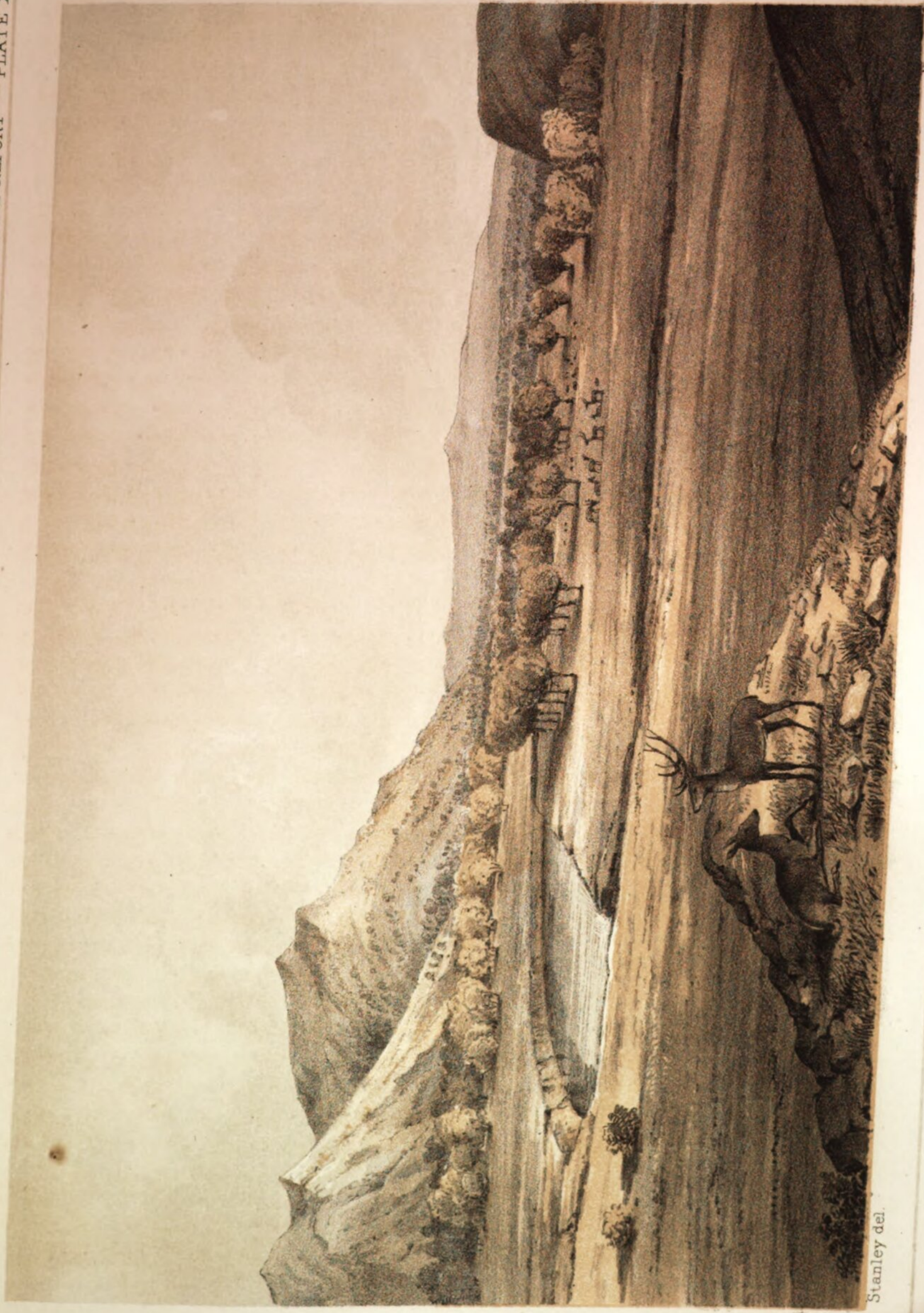
August 15.—Excellent road all day. Crossed Poplar, and encamped on the west side; excellent water and grass. Distance 18 miles. I now felt the importance of renovating my health, in order to prepare for the mountain work. It had been my custom thus far to continue at work until midnight, and to be up with the first in the morning. As Mr. Donelson had relieved me from many of the executive details, I now resolved to remain in camp and make a late start, the party moving off at an early hour.

August 16.—The road to-day was over the level river bottom of the Missouri. Timber in sight all day, the route running through timber for about one mile. Reached a camp where there was excellent water, grass, and abundance of timber at about 5 o'clock, making $23\frac{2}{3}$ miles. The animals came in in excellent order. I issued this evening an order directing every person in the expedition, so far as it was consistent with his duties, to walk a portion of the way each day; for, in approaching the mountains, my effort was that the animals should be increasing rather than running down in flesh, and our experience on the Mississippi had taught us that by care in all these particulars long marches could be made and the animals improve each day.

August 17.—Made 15 miles to-day, and camped on the Missouri at 2 o'clock. The road was over the level river bottom. Much side work has been done since leaving the Big Muddy by Lieutenant Grover, and Mr. Lander, and Mr. Tinkham, and the meteorological observations have been as numerous since leaving the Big Muddy as they were on the route up to Fort Union. We organized to-day a day guard for the care of the animals, the object being to keep them in the very best grazing, without picketing, as long as possible. One mule died to-day.

August 18.—Passed through to-day villages of prairie dogs. Crossed the Porcupine about five miles from camp. Encamped on the Milk river, 16 miles being the day's march. Here we determined to remain a day to prepare charcoal for the blacksmith, and to make observations for the geographical position of the mouth of Milk river, which is considered a very important point in the survey. Our camp was surrounded by a large growth of cotton-wood, and near it was a delightful spring of water. The valley of Milk river is wide and open, with a very heavy growth of cotton-wood as far as the eye could reach, which is also to be found along the adjacent shores of the Missouri. From the Big Muddy the road has been remarkably fine, and there was but one steep pitch which required care in descending with the train. There are, however, many little coulées along the route, where streams run in the spring to the Missouri and its tributaries, which would require bridging to make an easy and practicable road at that season of the year. From the slight examination made, the prairie country along the route is not only well grassed, but much of it arable. This is emphatically the case with the bottoms of the Missouri, which our route followed. Occasionally there would be shingle and a spur to pass over.

At this camp, which I named Camp Atchison in honor of the acting Vice President, I reduced to writing and issued in an order the instructions for the government of the expedition and the distribution of duties, under which we had been moving by my verbal instructions from the



MILK RIVER NEAR JUNCTION OF MISSOURI.



Stanley del.

J. Bien N.Y. lith.

A COTTON WOOD GROVE.

Big Muddy river. I availed myself of this opportunity to express my sense of the services of the several members of my party. This order is given at length in pages 41, 42, 43, and 44 of volume I of the Pacific Railroad Reports, from which it will be seen that Lieutenant Donelson was assigned the duty of acting as the executive officer of the expedition, and that he was instructed to take general charge of all the observations; and that, referring to the astronomical observations, it was enjoined that great attention should be given to those observations, particularly to those by lunar distances and with the portable transit.

I have deemed it proper to refer to this arrangement with the more particularity, as on page 635 of volume I a letter will be found from Lieutenant Donelson protesting against my statement that "*at Fort Union the observations were placed in charge of Lieutenant Donelson, with instructions, if practicable, to get longitudes by lunar distances, but Lieutenant Donelson was not able to report any results, except for latitude.*" My statement I reaffirmed in a letter to the Secretary of War, and in one to Lieutenant Donelson, for whose truth and honor no man has a higher opinion or greater confidence than myself. I expressed surprise at the terms of his protest. My written instructions, however, show conclusively that Lieutenant Donelson was in error, and that my original statement is fully borne out by the written orders, the only error in the statement being that the order was written at Camp Atchison, instead of Fort Union; but the verbal instruction was given at the Big Muddy river.

On the 19th there was some little alarm in camp in consequence of false reports about the vicinity of a war party of Blackfeet.

We left Camp Atchison on the 20th, and after moving — miles reached a very pleasant camp with excellent grass, wood, and water. In the evening there was a very heavy thunder storm. My order, to which reference has been made, was read to the gentlemen of the party this evening, and was the subject of general congratulation and not a little mischievous by-play or joking.

August 21.—This morning was clear, cool, and pleasant, and a delightful morning for moving. Engineer parties, both yesterday and to-day, have been actively at work getting in the country bordering the route of the main party. The road, as usual, was excellent to-day. I despatched a small party across Milk river to Panther Hill to observe the country. Game was very abundant to-day; plenty of buffalo, antelope, and beaver in the streams. A heavy rain and thunder storm occurred about noon. The instrument wagon, which had delayed us very much yesterday and to-day, in consequence of breaking down, I concluded finally to abandon and transfer the baggage to other wagons. Wild horses were reported as having been seen to-day by the reconnoitering parties. A fine eagle was shot and brought in to Dr. Suckley, our naturalist. To my exceeding regret, I found that there were points arising as regards the relations of army officers and civilians, and I concluded that the only way to overcome all difficulty was to pursue a firm, steady course, according to the terms of my written order. The distance to-day was seventeen and two-third miles.

August 22.—The route to-day was not as good as it has been since we left Camp Atchison. There were some little spurs to cross, and the valley itself was occasionally interrupted by shingle. The first sage was seen to-day, though in small quantities. We crossed, five miles from camp, Milk river and took a cut off to the south. Thus far Milk river has had a very gradual descent and a somewhat sluggish current. We made our camp, after moving nineteen and a half miles, one quarter of a mile from the river, in the vicinity of very heavy cottonwood, there being a high bluff between us and the river. The water to-night was poor, there

having been a high wind through the day, which affected the sands of the stream and made the water exceedingly muddy.

As usual, the evening was spent in considering the question of the proposed Blackfoot council and our relations with the Blackfeet, and in examining the work of the parties and preparing for the work ahead. We passed through great herds of buffalo to-day.

August 23.—We left camp late in consequence of the oxen straying, and about a mile from camp crossed Milk river. The order to walk some miles each day had been carefully observed, and the effect was to be seen upon our animals. On reaching our camping ground, which was in a hollow on Milk river, grass poor and water some half mile off, we found a deputation of Gros Ventres, consisting of seven of their chiefs and principal men, five of whom were accompanied by their wives. Among these were the Eagle Chief and his son, White Eagle, and the Little Soldier. The wife of the son of the Eagle Chief was a very pretty woman. Her name was the White Antelope. They welcomed us in the most cordial manner and were dignified in their deportment, which was marked by the strictest propriety. We were invited to visit their camp, about thirty miles further on. As it was my desire to exhibit to them our confidence and wish to enter into perfectly friendly relations, I invited them to join the gentlemen of the party assembled around a large camp fire. After smoking and talking for some time, lunch was served up about dusk, consisting of coffee, rice, &c., after which they made us presents of horses, giving one to myself and two to Mr. Culbertson, to whom they seemed to be much attached. There was a large tent put up for their accommodation, and a supper was provided about ten o'clock.

My health had now been rapidly improving for some days, and for the last three days I had rode a short distance on horseback. I now felt strong enough—riding a part of the time in my ambulance and part on horseback—to move more rapidly than the main train, and I determined to push ahead as rapidly as possible with two advance parties, in order to examine the approaches to the mountains. Accordingly, I organized two parties under Lieutenant Grover and Mr. Lander for the above purpose. To Mr. Lander I assigned four, and to Mr. Grover five members of the party. Each was provided with reserve horses, and with fifty days' rations of flour, sugar, and coffee. These arrangements delayed me somewhat, so that on the following morning, August 24, I got off somewhat late. We expected to reach the Indian camp to-night, but were obliged to go into camp $7\frac{1}{2}$ miles this side, where we found excellent grass and water. I determined to make our guard duty light. We had with us four gentlemen who could serve as officers of the guard, five men as non-commissioned officers, and seven privates. Our Indian friends were again with us to-night, and we treated them with bread and coffee.

I learned to-day that a feud has lately broken out between the Gros Ventres and the Blackfoot tribes. It is worthy of note, not only to commemorate the noble heroine who figures in it, but as it may become a matter of interest to our expedition and to emigrants coming over this route hereafter.

A Gros Ventre was married to a woman of the Blackfoot tribe. Travelling along, he was attacked, killed, and a fleet horse of his stolen. His wife was with him at the time, and the assassin immediately proposed that she should marry him, go northward, and the Gros Ventres would never learn of the death of one of their tribe. She assented. He gave her the slow animal upon which he had rode himself, mounting the fast horse which had been taken from her murdered husband. They soon arrived at water; she went off to get some, and on her return pressed him to go, as the water was very good. He did so, leaving his horse with the



Stanley del

J. Bien N.Y. lith.

MILK RIVER AND PANTHER MOUNTAIN.

squaw. After he had gone some two or three hundred yards she mounted the fastest steed, and pursuing a contrary direction, joined the tribe of her deceased husband and gave such information as would lead to the revenge of his untimely death. I find these Indians determined to revenge this outrage, and are now fitting out war parties for the purpose of cutting off straggling Blackfeet, and steal their horses.

The comet was very bright, and quite large.

August 25.—Took an early breakfast, and got off about 7 o'clock, Lander and his party having arrived about an hour previously. They left camp last evening and travelled till dark, camping about $1\frac{1}{2}$ mile back of us. Struck Milk river again on its banks; made a mid-day halt, where we lunched. Stopped an hour, and again went forward, making to-day $22\frac{1}{2}$ miles, when we reached the camp of the Gros Ventres, on the bank of Milk river, at about $3\frac{1}{2}$ o'clock. It was with much difficulty that we found grass sufficient for camping, as it had been eaten off by the large bands of horses belonging to the Gros Ventres, who had been in camp here some weeks. This camp consisted of 300 lodges, at least 1,000 horses, and over 2,000 Indians, men, women, and children. We were soon waited on by others of the tribe, dressed in their finest costumes, among whom I would name "The Cloudy Robe," who presented me with a horse, "The Eagle;" Big Top, The Discoverer, or Ball in the Nose, The Man who goes on Horseback, The White Tail Deer, The Running Fisher, The Two Elks, The Wolf Talker, The Bear's Coat, White Bear, The Clay Pipe-stem Carrier, The Old Horse, The Setting Squaw, The Little White Calf. They requested that none but our principal men should visit their camp this afternoon, in accordance with which I issued an order to that effect. Accompanied by the gentlemen of the party, I visited their camp and the lodges of the principal chiefs, at all of which we were treated with the utmost kindness and hospitality. They first received us at a large lodge prepared for the occasion, some twenty-five feet in diameter, within which some sixty were seated. We here smoked, drank, and ate, talked some time, and then visited the lodges spoken of. I was much struck with the prominent characteristics of this tribe. Polygamy is universal, several of the chiefs above named having four, five, and even six wives, one of whom is the especial favorite and mistress of the household. The husband will appropriate any of them to purposes of prostitution when he can profit by so doing. They appear to be a simple-minded race, easily influenced, and very kindly disposed towards the whites. They are filthy in the extreme in their habits, many of the women actually eating the vermin out of each other's heads and out of the robes in which they sleep. Being improvident, it is always feast or famine, either having abundance or else nothing. They furnished us to-night a mess made up of buffalo marrow, berries, and the scraping of buffalo (lodge) skins. It was, of course, improper to decline. I therefore took the proffered plate in each lodge, and enjoyed it much, though some of our party either declined it or ate but sparingly. Returned to camp about 8 o'clock, and fixed the next day for a council.

August 26.—The Pembina train arrived shortly after breakfast, and the main train about noon. The necessary preparations were made to prepare the feast, and about 1 o'clock the Indians were seated in squads of twenty or thirty around, to the number of nearly two hundred. Before the feast the Indians seemed to be in high glee, passing their time in singing their songs, which were accompanied with a sort of rattles which were made of the hoofs of antelopes strung very fancifully upon a piece of wood about a foot long, with which they marked time.

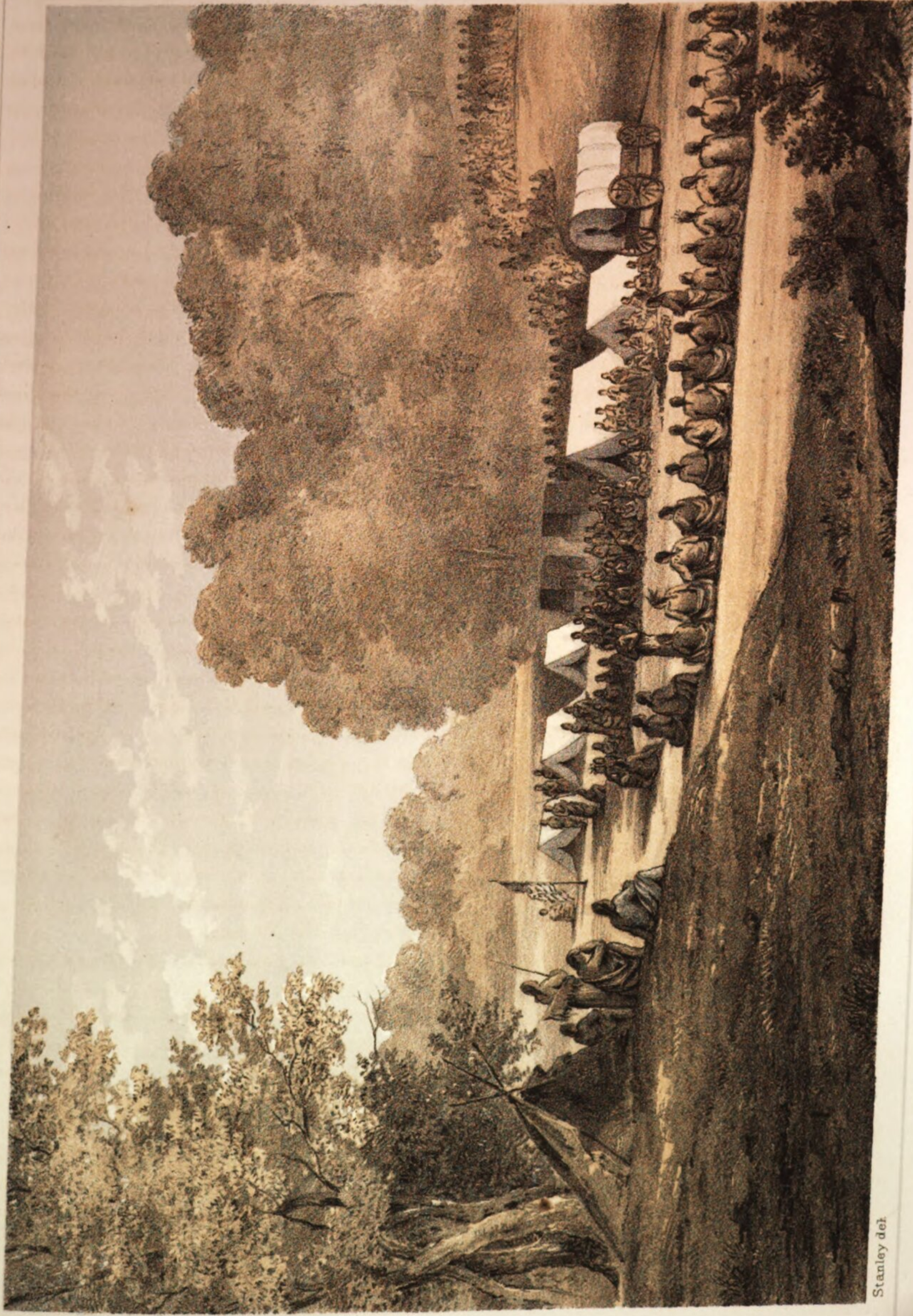
Shortly after the feast was over we had a council, at which the chiefs and many of the principal men, as well as several of the gentlemen of the expedition, were present. Mr. Culbertson

acted as interpreter. When I first commenced talking with them I found they were deeply enraged against the Blackfeet for the cause alluded to in the journal of the 24th; that they were determined to wage war against that tribe; to fit out war parties of their young men to cut off straggling Blackfeet, and steal their horses. I determined to put an end to this, and at once made a proposition to them to settle with that tribe on their delivery of the offender, or making a suitable reparation. I then explained the folly of going to war, how much they would suffer from it, and how little was to be gained; that it was the desire of the Great Father at Washington that all his children should be at peace with each other; that while war parties of both tribes were scouring the country the road was dangerous to the whites who should go there, and it was my duty to demand that they should not so act as to endanger a single man of my own party, or any white man who should hereafter travel through this region.

I then proceeded to explain the objects of the expedition in passing through their country and the motive which prompted this day's meeting. No idle curiosity brings me here, no mere desire to see the country or the Indians, but I was charged with a great public duty, to deliver to them a message of peace and assure them of the kind feelings entertained by the Good Father at Washington, of his desire to learn the wants of his children, and to make inquiry as to what might be done to ameliorate their condition. To secure the continuance of his good wishes they must be at peace with each other. Some of you were present or know of the treaty of Fort Laramie. On that basis I wish to make a treaty of peace between the Gros Ventrés, Blackfeet, Piegans, Bloods, and between these and the Indians west of the mountains who resort to the plains of the Missouri to hunt the buffalo. I then proceeded to explain the advantages which would arise to the Indians from entering into such a treaty and receiving from the government directly what they now get from other Indians. They would then obtain goods, provisions, &c., in the way of annuities; could keep their horses, instead of being obliged to go with their horses and purchase of other Indians, at an increased price, what the liberality and benevolence of the Good Father, in his fostering care over his children, would at once freely and abundantly supply them. I dwelt upon these and other advantages to them, and closed by insisting upon their reflecting upon these matters. "Think well of the matter. Suspend for the present your difficulty with the Blackfeet Indians. Let some of your principal men come with me to Fort Benton and we will try to settle the difficulty between the tribes. If it cannot be settled there let it be referred to a commissioner appointed or sent here by the Good Father at Washington, who will settle all your differences at a council of the tribes to be held next year, where the grievances of both parties will be fully heard. But I must insist, as before stated, on a safe conduct of every white man through this country."

I again advised a peace between all of them, and soon after the first meeting broke up, without any answer to my propositions or suggestions.

They then held a consultation with their braves, warriors, and principal men. In about an hour we again met. They assented to every proposition I made. Some of their chiefs consented to accompany me to Fort Benton, and the whole tribe announced their willingness to wait until some time next year and refer their difficulties to such a council as was spoken of, to be held at such a place as should be hereafter designated. We continued the talk for some time, after which the Indians were invited to come over to the camp of the main party and witness the firing of the howitzer, which seemed to give them much pleasure, my explanation creating in their minds much surprise. The Indians around camp behave with great propriety.



J. Bien N.Y. lith.

DISTRIBUTION OF GOODS TO THE GROS VENTRES.

I have not yet heard of the smallest article being missed, although they are seated around everywhere, and many loose articles are lying about.

They express great friendship for the whites, and evince the kindest feeling to our men. About 5 o'clock we made a distribution of the presents and provisions designed for this tribe, consisting of blankets, shirts, calico, knives, beads, paint, powder, shot, tobacco, hard bread, &c. They received them with the greatest satisfaction—no grumbling or envy was manifested among them. They continued about our camp, loitering, smoking, and talking all the afternoon and evening.

The comet spoken of a day or two ago appeared to-night, shining most brilliantly in the northwestern part of the heavens, and the aurora borealis presented a beautiful appearance. At 9 o'clock I caused to be fired three more rounds of the howitzer.

The camp of yesterday and to-day we have named Camp Armstrong, in honor of Robert Armstrong, esq., editor of the Daily Union.

In the course of the day I was much gratified with the proposition made by Lieutenant Grover for a party to remain at Fort Benton and cross the Rocky mountains in the worst winter month, say January, with a dog train, to ascertain the depth of snow, and such other facts in regard to the crossing when the greatest obstacles are presented. He volunteered to take charge of the service with six men.

August 27.—Busy this morning in endeavoring to effect the purchase of horses from the Indians and trading them. We succeeded in exchanging some animals which were unfit for the service of the expedition for better animals. We received several very good horses in place of six very indifferent mules which we could not possibly have used before reaching Fort Benton, and some of them not for months. Several members of the expedition bought horses for clothing, guns, &c., their private property, thus relieving for the use of the expedition their present riding animals. By the distribution of presents and provisions, and consumption at camp, we lightened our loads some 2,000 weight, apart from the issues to the detached parties, and have received some eleven or twelve serviceable animals in place of unserviceable ones, besides some four new ones purchased by members of the party, two presented to me, and two purchased by Mr. Culbertson.

Moved about noon, and after making seven miles went into camp; wood, water, and grass excellent; the main train came to within a half mile of us.

Lieutenant Donelson suggested this morning that he should be placed in charge of a party at Fort Benton to go northward to the Edmonton House, taking a cross section of the whole mountain range, cross the Rocky mountains in that latitude, explore the sources of the Columbia, come down it, making its survey, and connect with our work. I feel much gratified at such marks of interest in the expedition as are shown by such propositions, and only hope it may be practicable to carry both into effect.

August 28.—I made to-day twenty-four and a half miles with the advance parties. The greater portion of the route the road was very level and the grass excellent; but as we approached camp there were some hills and coulées to cross. We happened to find a camp with bad grass, although within a few miles we had met several camps with very excellent grass. I was very much pleased with the good offices of "The Running Fisher" to-day, who brought into camp two of our missing horses. By my invitation he will accompany us to Fort Benton.

From the best information which I can obtain from the Indians, Cypress mountain must be

some 120 miles north by the road they travel, and some 70 or 80 miles in a direct line. It is, therefore, in British territory.

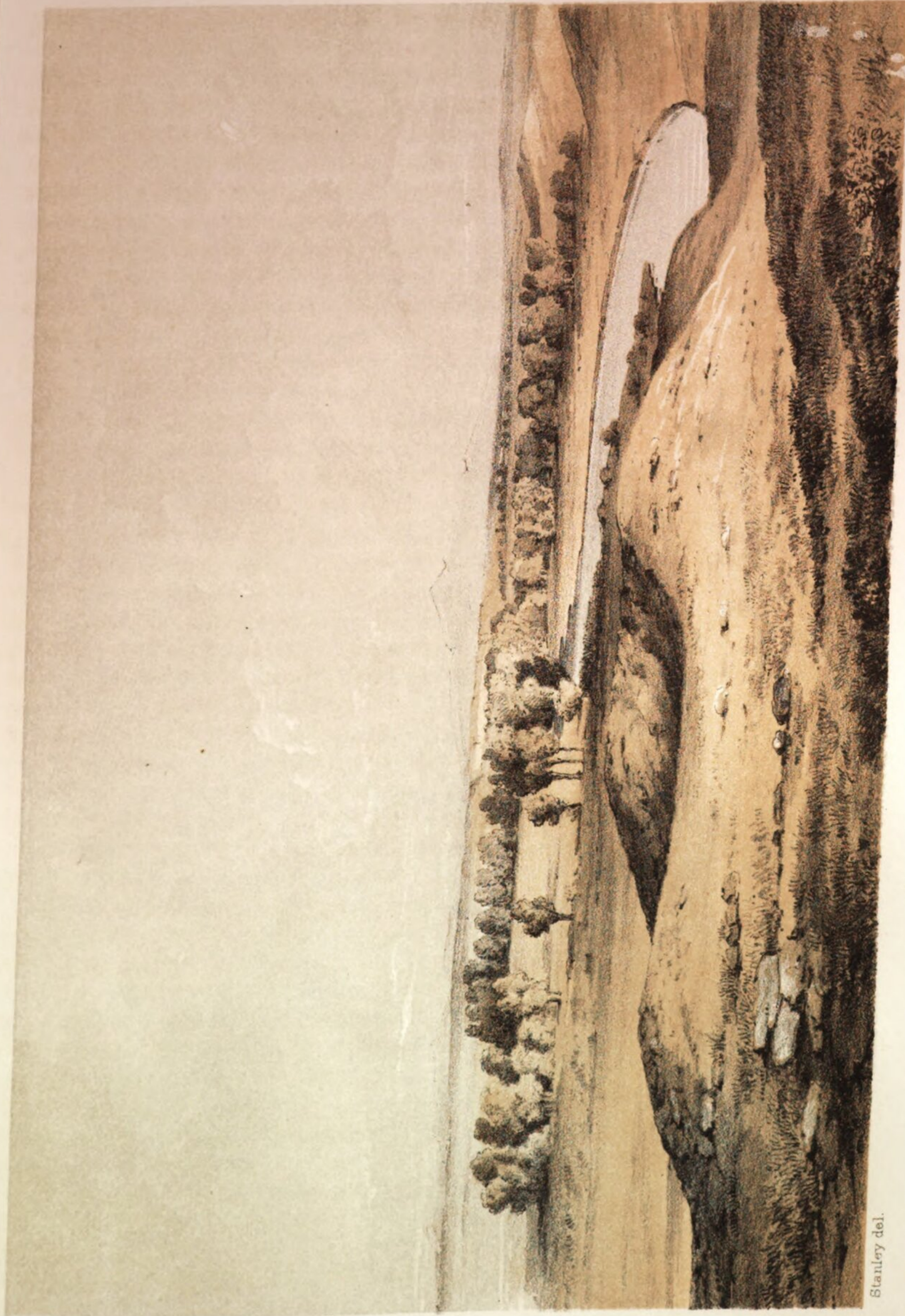
I determined to-day upon Lieutenant Grover's field of duty, which was, first to cross the mountains by Caddo's Pass, to open a connexion with Lieutenant Saxton and the western division; then to return to Fort Benton, to make a survey of the upper Missouri to connect with the survey made by Lieutenant Donelson; then to return to Fort Benton by the route between the Milk river and the Missouri, make the best examination of the country his means afforded, and in the winter starting from Fort Benton to cross the mountains with a dog train, and determine the character of the snows and winter climate between Fort Benton and Puget's Sound.

August 29.—The road to-day was not as good as usual; the river bottom much dried up, with deep cracks in the soil, and the numerous holes made by the prairie dogs were even, at times, a worse obstacle to our progress. The presence of Indians with us led to many inquiries respecting them.

Mr. Culbertson estimates the number of Gros Ventres at about three hundred lodges, ten persons to the lodge, of which the proportion of men to women is one to two, the number of men being about six hundred. On his arrival in the country, some twenty-three years ago, they numbered about four hundred lodges. In 1838-'39, by a junction of the Crees and Assiniboines, some sixty lodges were entirely destroyed and wiped out at Julius mountain. A few years subsequently another attack was made at Cypress mountain, in which sixty more lodges were exterminated, three men only escaping on this occasion "The Setting Squaw," father of the one mentioned in the journal of the 25th. From Mr. Culbertson I also learned that in 1833, soon after his arrival in the country, he and four or five other whites, with a party of Blackfeet Indians, were attacked by a war party of Assiniboines, numbering some seven or eight hundred. The field was contested all day, night only ending the conflict. On the morning, however, the Assiniboines did not resume the attack, and abandoned many of their dead on the field. A considerable number of Blackfeet were also killed, but none of the whites.

Made our halt about twelve miles from camp, where we dined, resting from about half-past 10 till 1 o'clock. By an accident, the wind being high, the prairie took fire, and extended over considerable surface. Our dining place was on a branch of the Milk river flowing from the Cypress mountain. Its channel and drift marks, though dried up now, indicate that at the season of freshets it is quite an important stream. Parallel to this, and some three miles further on, crossed a second branch, issuing also from the Cypress mountain. By a bend the two branches nearly meet, forming what is called the junction.

August 30.—Yesterday we were in sight of the Bear's Paw, quite a broad and rugged mountain upheaval, stretching from Milk river to the Missouri. From the best information which I can gain of this mountain there are many trails through it easy for pack animals, and probably no difficulty would be found in getting through it with wagons. I sent off Lieutenant Grover, Mr. Lander, and Mr. Stanley to make an examination of the Bear's Paw, as far as it could be done by ascending one of its highest peaks, and also to sketch in the whole surrounding country, especially the portion between the Bear's Paw and the Rocky mountains. We estimated our distance from the Bear's Paw at the peak they would ascend to be about seventeen or eighteen miles. I moved on myself with the remainder of the party, having determined that I would no longer ride in the ambulance, but would make the effort to push forward either on



Stanley del.

J. Hien. N.Y. lith

BEAR RIVER - BEAR'S PAW MOUNTAIN IN DISTANCE.

horseback or on foot. After moving some seven or eight miles I suffered so exceedingly from riding that I walked on some five or six miles, with great difficulty, on foot, until coming to a good camp on our second crossing of Milk river, and the point where we were to leave Milk river on our way to Fort Benton, I halted the party and rested for some two hours. This gave me strength enough to mount my horse and ride to camp, eighteen miles further on, on a tributary of the Box Elder, and in a straight direction from where we left Milk river. After leaving Milk river we crossed several branches of the Box Elder creek, which is a tributary of Milk river that has its source very near the Missouri, and is on our general line to Fort Benton. The ascent is very gradual from Milk river to our camp; the soil generally is very good. The view this afternoon was delightful. Bear's Paw itself presents a rugged, grotesque appearance, and it requires no great stretch of the imagination to see in it the paw of a grizzly bear, ready to spring upon the plain.

The Three Buttes, or the Sweet Grass hills, some sixty miles to the northward of us, is a favorite resort of the Blackfeet, who say that Providence created these hills for the tribe to ascend and look out for buffalo. Southward we have a view of mountains on the other side of the Missouri. Our distance to-day was $29\frac{1}{2}$ miles.

I had forgotten to mention that at the upper portion of Milk river, for some thirty miles, the water appeared only in pools, but it was exceedingly cool, delightful, and pure, and was evidently running water. There is a singular fact connected with all the streams of this country, which become dried up in the summer and fall, but as soon as the cold weather comes on the water rises in the streams, and the usual quantity of water passes down. The fact is, the streams do not dry up; only in the summer and early fall their course is in the sands, and by sinking wells the purest and clearest water would be found at a depth of but two or three feet; and I have no doubt, from my own personal observation, that ample supplies of water would, in the driest season, be afforded by Milk river for the largest emigration, or for the largest business of a double track railroad.

I felt some apprehension in relation to the safety of Messrs. Lander, Grover, and Stanley, as they did not reach camp to-night. I will here state that, before leaving the main party at the Gros Ventres' camp, I gave verbal instructions to Lieutenant Donelson to detach Mr. Tinkham, on his reaching the point of departure from Milk river, to make an examination of the Three Buttes, and of the country generally between the Milk river and the Marias.

August 31.—We made an early start this morning, moving off first with the wagons, and leaving the pack animals behind for an hour to feed. We had a shower, accompanied by lightning, before sunrise; crossed several coulées in the course of the morning, and in twelve miles came up to the upper waters of the Box Elder, which was a clear, limpid stream, affording an unfailing supply of water. We then pushed on some five miles over a fine rolling prairie, to a coulée in the hills, where there was a spring; and here we halted to dine. I was very curious to examine carefully this spring, and found that it is a great resort for buffalo. Considerable water flows from it, but the ordure of the buffalo was in such great quantities about it that it infected the water, and, moreover, they had trampled all the ground, and had stirred up the water of the spring, with their feet. We, however, thought it would do well enough for us to make coffee, and we accordingly managed to get up a very respectable meal. After stopping three hours we continued ahead over a very good road. There was a shower of rain and hail about 4 p. m. At 5 the Missouri was in sight, the Belt mountains looming up beyond it, at a distance of not less than fifty miles. After a march of 33 miles from our morning camp, we

came to a place called the Springs, where the water was dried up, where there was no wood, but very excellent grass. We pitched our camp in a coulee surrounded by high bluffs, and went to work to dig wells for water, in hopes to give our animals some. We succeeded in getting a small quantity for each. There was very high wind and a heavy thunder shower until near midnight. My tent was blown down twice, although I succeeded finally in keeping it standing by securing it with weights and heavy stones. Generally, most of us had to go to bed without our suppers; but our Indian friends assisted us very much in the night in looking out for our animals. Grover, Stanley, and Lander have not come in, which gives me a good deal of apprehension. The Running Fisher told me an amusing story to-day. The Bear's Paw, as one would infer from its wild and stern appearance, has been a scene of Indian fight and massacre. Seven years ago a fight occurred in the Bear's Paw between their tribe, allied with the Blackfeet, and Crows, in which he killed one of the latter tribe. The Crows occupied an impregnable post, from whence they could shoot down all who approached within twenty paces. A Blackfoot was shot in the head through a fissure in the rocks. The Gros Ventres then determined to surround and starve them out; at night the Crows got off with the loss of one man, killed by "Running Fisher."

September 1.—This morning we made an early start, and crossing over a high rolling prairie for $11\frac{3}{4}$ miles we came to the Marias river. The descent to this river on a trail is somewhat steep, and is in altitude some two hundred and odd feet. The river itself here presents a beautiful view. It is a clear limpid stream, flowing over a pebbly and sandy bed, the bottoms lined with cotton-wood of heavy growth, with thickets of the service and other berries. Belt mountains are very distinctly visible in the distance, as is also Citadel Hill, called so because its base rests upon the Missouri, and it rises perpendicularly like a bastion, some two hundred feet high. Near by is Square Hill, so called from its supposed resemblance to that geometrical figure. These and other elevated points will enable us to get a view of the approaches to the Rocky mountains.

At our noon halt, or near by, was the scene of a sanguinary conflict between the Gros Ventres and the Crows, in 1849, in which twenty-two of the latter were killed. Several of those travelling in our company figured in the action. A party of Crows to the number of twenty-two were concealed in the hollow just in advance of where we dined, for the purpose of stealing horses from the Gros Ventres' camp, consisting of two hundred lodges. Being discovered, the Gros Ventres surrounded them and threw up dust in the air, which was carried by a strong wind in the faces of the Crows, blinding them, when the Gros Ventres rushed upon them and killed the whole number without losing a man. Among the Crows was a Gros Ventre who had been taken prisoner in early life. He begged for his life, told who he was and his family, but against him very properly they executed their wrath, telling him he had no business to come on such an errand against his own people. The Crows fought bravely; one of their number, with knife in hand, jumped down a hill some sixty feet, but was despatched before he had done any injury. None were left to carry home the news.

We were off about noon; passed over the prairie, and descended into the valley of the Teton, where we met Mr. Clarke, in charge of Fort Benton, who came out to meet us. The express which I had despatched from the Big Muddy reached Fort Benton in due season, and had gone back to meet us; but having taken the route through Bear's Paw, they struck our trail in our rear and had not yet come up with us. We arrived at Fort Benton at $3\frac{1}{2}$ o'clock, where we were received with a salute of fifteen guns.

September 2.—I was occupied to-day in interrogating voyageurs and Indians in regard to the passes of the mountains and the general character of the country, and also in buying and exchanging horses to fit out the advance parties. Of many Blackfeet Indians that I questioned only one had crossed the mountains to the Bitter Root valley as late as November. Their surmises as to the depth of snow on the passes were very different. Some were of opinion that the snow would be so deep in the second moon after this that the route would be utterly impracticable. One Piegan, the Three Bears, told me there would be snow in the mountains the latter end of October. I asked him the question whether there would be snow on the trail or on the mountain peaks, and he said simply on the mountain peaks. A Blood Indian, the White Crane, gave me the following itinerary of a wagon road from Fort Benton to the Bitter Root valley, which I give entire, as the accuracy of it has been subsequently established by the surveys of Lieutenant Mullan. *Blood Indian*, "White Crane," says that the Flatheads, who travel fast, can go to St. Mary's in four days, say, fifty to sixty miles per day. Same Indian says it would take us thirteen days with wagons. Road good except one or two hills requiring attention.

He would go to Sun river in three days, keeping at head of Rannis leading into Missouri river. First night he would encamp at a spring; second night at a lake, water good, but no wood; third night on Sun river. He goes up Sun river one day and strikes towards mountains. Four days to ridge, where difficult parts occur; plenty of wood; water and grass improving all the time from this point. *Ninth day.*—Ascent to ridge difficult, requiring labor for wagons; descent good; camp on a stream, tributary of the Missouri, but west of this mountain. *Tenth day.*—Pass over a level plain and camp on another tributary of the Missouri, called the Red Shell river. *Eleventh day.*—Go over Prickly Pear prairie and reach foot of next dividing ridge. *Twelfth day.*—Go over dividing ridge and reach a creek which flows into Columbia. Pine timber, no rocks, and good road through. *Thirteenth day.*—Follow creek down and camp a little distance this side of its entrance into the large river. *Fourteenth day.*—Follow creek down to Big river, and then follow Big river; it is a plain good road. From this point it takes seven days of good road, slow marches, to go to the St. Mary's village.

These Indians whom I interrogated had frequently crossed over to the upper waters of the Platte and the Snake rivers, and they informed me that the whole country was open, and that there would be no difficulty in moving from Fort Benton, over quite a number of trails, to the emigrant route from the States *via* Fort Laramie and South Pass to Salt Lake; and they described the country as for the most part a very desirable one, excellent for voyaging, and abounding in wood, grass, and water. The voyageur, Hammell, gave me the following account of Cadotte's Pass:

Hammell says: Follow the general course of Missouri till you strike the Sun or Medicine river at such distance as a 3 days' journey from here to the spring where we encamped, (24 miles.) The road is good, but you have to make such marches as will enable you to meet certain springs, in order to secure good camping places.

Medicine river is followed in the valley some 50 miles, when you reach the mountains. Good roads; timber plenty, and grass good.

He estimates Cypress mountain to be three days journey from this point, of forty miles each, a little east of north. From that point to the Koutenay country the distance is eight days for Indians with fast horses, and ten days with slow horses. I began, now, to feel a good deal of apprehension in consequence of not hearing from the missing gentlemen who visited the Bear's Paw, and it seriously interfered with my views in regard to sending forward advance parties.

I visited to-day the post of the other company, and will take this occasion to describe Fort Benton and Fort Campbell, together with the neighboring country.

Fort Benton stands on the eastern bank of the Missouri, near the Great Bend, and 377½ miles above Fort Union. The river is here perfectly transparent at most seasons of the year. The Teton river empties into the Missouri six miles below Fort Benton; the Marias river twelve miles below; and Milk river 200 miles below. The Falls of the Missouri are 18 miles above this fort. The muddy character of the Missouri has its commencement at the mouth of Milk river, which takes its name from the whitish muddiness of its waters. The ascent from the wide grassy plain in which the Fort is located to the high table-land is somewhat abrupt, the only passage on a level with the plain being close to the river on the south, and very narrow. Fort Benton is smaller than Fort Union. Its front is made of wood, and the other sides of adobe or unburned brick. It usually contains about a dozen men and the families of several of them. Its general arrangements and purposes are of like character with those of Fort Union. The Blackfeet Indians are the principal traders here. It is the custom of the several bands of this tribe to locate in sheltered and otherwise eligible places, in the vicinity of wood, and water, and grass, in the early winter, and to continue as inert as possible until the melting of the snow. At such times the half-breeds of the fort visit them, with goods upon horses and mules, and exchange their merchandise for the skins and furs captured by the Indians.

Fort Campbell is situated on the same plateau with Fort Benton, and about half a mile above it, and is built in very much the same way as the latter place.

September 3, 1853.—I made arrangements this morning to send an express to Lieutenant Donelson, directing him to make the necessary arrangements to search for the missing gentlemen of the party, and as the express was about setting forth I was agreeably relieved from its necessity by their coming into the fort. They were in fine spirits, although they had eaten but little food since they left me on Milk river, had travelled a very long distance, partly on foot, and had been a good deal annoyed by the loss of so much time at a very important point of the progress of the survey.

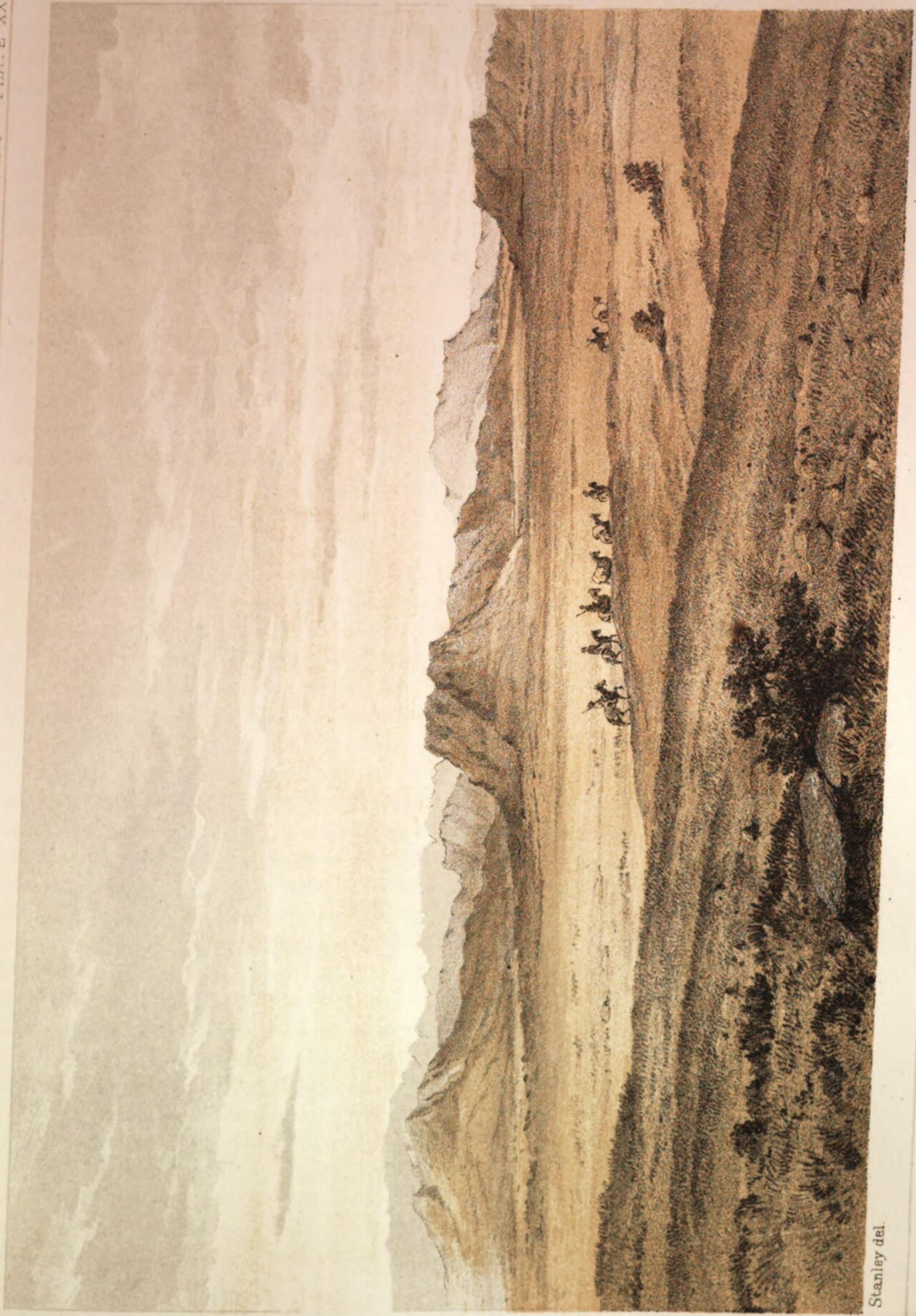
The incidents of this trip are as follows:

At 8 o'clock, on the morning of the 30th of August, Mr. Stanley, in company with Lieutenant Grover and Mr. Lander, left the advance party on the right bank of Milk river, and crossing the stream ascended a prominent spur of the Bear's Paw range of mountains, about six miles from their point of departure, the understanding among them being that I would not cross the river until noon, when they were to join me. Mr. Stanley having made a couple of sketches, and noted the more striking characteristics of the surrounding region, they descended at an angle that would have led them to my trail if I had passed over at the hour they had understood to be designated; but finding no trail on the left side they concluded that I had not yet crossed, and they accordingly returned to the right bank and travelled in a more northerly course in the hope of falling in with me. I had forded the stream, however, much earlier than they had expected, and had halted for the noon repast in the rear of the place at which they sought my trail, and soon after crossed their track without distinguishing the recent footprints of their three horses from others they had themselves noticed.

Finding no trail on the northern margin of the river, they ascended the bank and proceeded about six miles up the stream, when, seeing in a southerly direction what they supposed to be smoke, and readily concluded arose from my camp, they changed their course, but before reaching the valley of Milk river they saw other like appearances, which they were then able



FORT BENTON



Stanley del.

J. Bien N.Y. lith.

BEAR'S PAW.

to determine to be dust and not smoke. Night was now upon them, and they were constrained to halt. Their horses found abundance of grass here, as elsewhere throughout this region, but they were without food, without blankets, and even without coats, and the nights were unpleasantly cold.

On the morning of the 31st they early resumed their search for the trail. After going up the valley about three miles they entered a dry fork of Milk river, which they traversed three miles further up, when they ascended the left bank and took a course east of north for twelve miles to a divide. Here, after a short halt, it was determined that they should return to where they had separated from the party in the vicinity of the Bear's Paw, although Mr. Stanley's judgment was in favor of proceeding on their way with a more southerly inclination; that is to say, by inclining more to the left until they should reach the Missouri, which they subsequently ascertained would have been their true course. But having no ammunition, and as it was not unlikely that they might fall in with a party of Blackfeet Indians in their approach to the Missouri, of whose friendly manifestations they could have no better guaranty than their ability to protect themselves, considering all the circumstances of the case, the resolution formed was deemed the more prudent, especially as it was certain that they could at the Bear's Paw discern and from that point follow my trail.

On this morning two antelopes appeared in view; their desire to slay one of them was intense. Every conceivable precaution was adopted, and Mr. Stanley was selected to fire the only gun. Lying upon his face within a "buffalo wallow," and taking advantage of the well known curiosity of this animal, he displayed a handkerchief in the manner of a flag to decoy him, and held the gun in position. He approached warily, and Mr. Stanley as warily awaited his coming. The moment to fire was as soon as his eyes would be perceived above the intervening irregularities of the ground, and before he should take fright from the glance of the hunter. He fired at this moment, and missed him! His anxiety had been too great for the perfect poise demanded by the crisis. The messenger passed too high between his ears, and his life was spared, while they were doomed still longer to endure the pangs of hunger.

They suffered much throughout this day, and at 10 o'clock in the night halted for rest. At midnight the wind blew violently, when they arose and lighted a fire with one of the only two matches in their possession. At daydawn they resumed their journey down Milk river and soon found the object of their search—the trail of the advance party. They started upon it in good heart, resolving that they could and would fast for the three days required for the journey to Fort Benton. The import of this resolution was, that though they might suffer from extreme hunger, their valued horses should not be sacrificed for food, and yet they were already very weak. Little did they then anticipate the relief so providentially near them. Within three miles lay encamped upon their road the main party of the expedition, under the command of Lieutenant Donelson. Their greeting was cordial as they approached, and all their wants were soon supplied. At 10 o'clock they were again on their way, with fresh horses and three days' rations, and a guide similarly furnished. In the evening, after a most harassing ride of 25 miles, they encamped on a southern fork of Milk river.

On the 2d of September they followed my trail until noon, but as it proved indistinct, and as their guide professed to be competent to conduct them to the fort, they followed him beyond the Marias river, when they soon found him entirely unacquainted with the country. Late at night they encamped on the Teton river, supposing it to be the Missouri; but at daylight on the 3d they were convinced that they were not on the Missouri, but had travelled too far to the

right and gone beyond Fort Benton; they, however, finally reached it at noon, just as a command of fifteen men were about to depart in search of them.

September 4.—I concluded not to push off the advance parties to-day, as many of the animals required rest. Mr. Stanley commenced taking daguerreotypes of the Indians with his apparatus. They were delighted and astonished to see their likenesses reproduced by the direct action of the sun. They worship the sun, and they considered that Mr. Stanley was inspired by their divinity, and he thus became in their eyes a great medicine man. Yesterday and to-day I was also much occupied in examining Indians and getting information of the country.

September 5.—The necessary arrangements having been made last evening, Lieutenant Grover started about 11 o'clock to-day to open the communication with the western parties. He was instructed to cross the mountains, proceed to the Bitter Root valley, ascertain if Lieutenant Saxton had established the depot of provisions at that point; and in the event of not meeting Mr. Saxton, he was directed to continue on to the Kootenay post, in order to get information of the whereabouts of Captain McClellan. From that point he was to despatch an express to Captain McClellan, informing him of our arrival at Fort Benton, and return immediately to that point. The field of duty which I have mentioned in the previous part of this narrative as that which I had determined to assign to him was now set forth in orders, and I congratulated the expedition that a gentleman of his known energy, ability, and good faith could be availed of in the determining of such important facts as the navigability of the Upper Missouri, and the obstructions to be expected from snow during the winter from Fort Benton to Puget's Sound. Dr. Evans also arrived to-day in fifteen days from Fort Union. He took the route between the Milk and Missouri rivers, passing through the Bear's Paw, and reports having found many delightful, well grassed, and arable valleys in this mountain, and that indeed generally, between these two rivers from their junction, the country was exceedingly well adapted to voyaging; water, grass, and wood, to be found at short distances, and much of the land he represents as being arable. The Doctor made a large collection in the Mauvaise Terre, and made quite a circuit on his way to Fort Union, finding a large extent of country between Fort Pierre and Fort Union, south of the Missouri, a prairie country instead of a country of hills and mountains, as had been generally supposed; grass not only good, but the country emphatically cultivatable. This strip of country stretches southward some fifty miles from the Missouri.

Indeed, I am now impressed with the opinion, which I have got from various sources, that there is a large extent of country, cultivatable, both north and south of the Missouri, especially as you approach the mountains in the neighborhood of the Yellowstone and its tributaries, particularly the tributaries flowing into the Yellowstone from the south side, until you reach the South Pass emigrant trail.

From Dr. Evans' representation of the grades of the route between the Milk and Missouri, I became anxious to run a line of levels, because a good practicable route might be found that would considerably shorten the distance of the route pursued by us. Mr. Lander was busily occupied to-day in fitting out his party for the survey of the Marias Pass, in reference to which I also gained some general information that satisfied me of the existence of a pass in that quarter; since I have given my attention to the passes of these mountains, I have been greatly impressed with the fact, from the course of the streams and the general deportment of the country, that there must be a good and practicable pass leading from some branch of the Marias; and at this time I was sanguine that we should find there the best solution of the question of the railroad practicability of the Rocky mountain range. I preferred, however, to



THE TON VALLEY.

Stanley del.

J. B. Ier N.Y. 11th.

move the main train, and to make the observations upon some line, in regard to which our information was so definite that we could be sure that the expedition could reach its destination this fall, as it would be very easy to connect side lines with the line of the main train, for the different gentlemen in charge of detached parties were assisted by men who were both able to run compass lines, sketch in the topographs, and were provided with barometers and assistants to take the altitude. I gave Mr. Lander authority, with certain exceptions, to select his animals from my whole train, deeming it important that he should be exceedingly well fitted out, as he would probably have a long distance to make before he joined the main party in the valley of Clark's Fork.

September 6.—The main party, under Lieutenant Donelson, reached the Teton early this morning. Nothing unusual occurred since I left them, except that they were at one time in great danger from a prairie fire, which, however, was checked and every thing saved by the good arrangements of Lieutenant Donelson and the energy and exertions of the party. On leaving Milk river he halted a day to fit out Mr. Tinkham in his reconnaissance of the Three Buttes, and the country thence along the mountains to Fort Benton. The animals came in in very excellent condition, considering that they had moved some eleven hundred miles from the Mississippi; and I determined at once to push Lieutenant Donelson ahead with a small party of some twenty-five men, in order to reconnoitre the approaches to Cadotte's Pass. The train was to follow some days subsequently, it being important that the animals should have a few days' rest; and believing, from the information before me, that it was entirely practicable, by vigor and good judgment, to push our wagons through, I made such arrangements as left Lieutenant Donelson free to make the survey, and would devolve upon the acting quartermaster, Mr. Osgood, the charge of managing the supply train. As will appear hereafter, these arrangements were not carried out.

For myself, it seemed to me important that I should visit the main camp of the Blackfeet near the Cypress mountain, confer with their chiefs in regard to the contemplated council at Fort Benton next year, and secure guides for the survey of the Marias Pass; and I expected, after accomplishing this, to be able to overtake the main party before it reached the Bitter Root valley, and probably by the time it was ready to cross the divide of the Rocky mountains. I desired, also, personally, to examine the approaches to, and the entrance of, the several passes of the mountains from our parallel southward.

September 7, 8, 9.—I was occupied these three days in preparing instructions to Lieutenant Donelson, conferring with Dr. Evans, our geologist, and making my reports to the War Department and the Indian commissioner; and I very frankly and explicitly stated that to continue the survey, and to carry out the instructions with regard to the work to be accomplished, it was absolutely necessary to incur a deficiency; believing that if the facts as they existed were known to Congress and the department, their instructions would be for me to continue on, I determined to incur the deficiency and to make the survey. My instructions required of me to examine into the question of the snows on the route, into the freshets of the streams, and as to the period of time they were locked up by the ice, to do which it was indispensable that there should be winter posts established at Fort Benton and in the Bitter Root valley, and it was desirable in connexion with these posts to have such arrangements made and such facilities afforded as would enable the gentlemen in charge of them to continue the explorations of the passes and of the adjacent country. Being satisfied that this Indian council would have a weighty influence in the whole question of emigration on this route, and of any operation which

might be undertaken by our government and its citizens, either in the way of wagon roads or railroads, I urged the matter of a Blackfoot council upon the Indian department. Lieutenant Mullan, who had accompanied Lieutenant Donelson up the Missouri, and had assisted in the observations from Fort Union to Fort Benton, I assigned to the duty of visiting the Flathead camp, supposed to be at Muscle Shell, and conveying to them a message of peace and good will; my desire to make a permanent peace between them and the Blackfeet, and to build up anew their beautiful St. Mary's village. Lieutenant Mullan's party consisted of Mr. Burr, Amstant, Levi, Nichols and Frank Genette, voyageurs, Peter Martin, hunter, White Crane, Indian guide.

He was instructed to procure from them experienced guides and to examine some good pass, of which several were known to exist, leading from the forks of the Missouri to the Bitter Root river. From the Little Dog, a prominent chief of the Piegan tribe, and a man of character and probity I got a very particular description of the Marias Pass we were in search of. From some superstition of the Blackfeet, it has not been used for many years, but formerly it was almost the only thoroughfare made use of by the Indians on each side of the mountains in passing to the other side—a broad, wide, open valley, with scarcely a hill or obstruction on the road, excepting here and there some fallen timber. At present the Little Dog described it as being much grown up with underbrush; though the trail was visible and well marked on the ground there would be some labor for a train to make its way through, and it might be necessary in some few places to cut out the road. I gave my instructions to Lieutenant Donelson on the ninth instant, inspected the train, found every thing in good order, the men cheerful, satisfied, and confident as to going on, and the means of transportation ample, and set off towards night, having been preceded a few hours by Mr. Lander, on the way to Cypress mountain. I camped that night on the Teton, fourteen miles from Fort Benton. Perhaps these instructions to Lieutenant Donelson have been sufficiently referred to, but it was impressed upon him the importance of starting at once with the advance party, as it would be necessary to move slowly, perhaps halting every other day, in order to get that full knowledge of the country approaching the mountains, which was essential, in order to lay down our railroad line to the best advantage. I will here remark, that besides the party of Mr. Lander, I was accompanied by Mr. Culbertson, special agent, Mr. Stanley, artist, Augustus Hammel, interpreter, and three voyageurs.

September 10.—We had been joined last evening by a considerable party of the Blackfeet, who accompanied us to-day; the principal men being the Little Dog, the Three Bears, and the Wolf that Climbs. Started before seven, and after travelling some three hours reached a fine spring, with excellent grass, at a celebrated land-mark known by the name of the "Rotten Belly Rocks." It is a formation of sandstone, and has the characteristic of the Mauvaises Terres.

Columns with capitals, resemblances to the human figure, &c., &c., abound. Beneath, in the coulée passes the broad Indian trail leading to the Piegan camp. Here was killed "Rotten Belly," the Crow chief, in an encounter between one hundred of his braves and eleven well-armed Gros Ventres of the Prairie.

The Crows had beleaguered for a month Fort McKenzie, in charge of Mr. Culbertson, who in a starving condition held out, with 19 men and 29 squaws, dressed in mens' clothes, against them, with a loss of all his animals, 35 horses. The party of the Crows then separated, and Rotten Belly, with a portion, mortified at his failure, declared he would go north and seek death in battle. On reaching the rocks and seeing the Gros Ventres, he said: "Here I will die to-day,

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Stanley del.

J. Bien N.Y. lith.

you have brought me to this," and rushing upon his enemies he killed two, and then received his death wound. Before his death he advised his people to be the friends of the whites, saying it was their only chance to escape defeat and utter ruin.

Kept on through the afternoon, passing over a rolling country, tolerably grassy, occasionally crossing hollows where water runs in the spring, and reached the Marias about half-past four o'clock, when we camped. This stream at our crossing was about fifty yards wide, one foot deep, and of somewhat rapid current, and the river valley was about a mile wide. There was plenty of cotton-wood, and we had a most excellent camp. Spent the evening in conversation with the Indians who accompanied us.

September 11.—We were off about seven o'clock, and after travelling until near noon halted at a spring, where we procured a small supply of water. Here I lost my pistol, (Colt's revolver.) Continuing on without unsaddling, in less than an hour I was overtaken by Baptiste Champagne with an express from Lieutenant Donelson, inclosing a brief report from Lieutenant Grover, to the effect that Lieutenant Grover met Lieutenant Saxton near the dividing ridge, and that they were returning together to Fort Benton. Lieutenant Grover intimated in his brief letter that Lieutenant Saxton reported the route could not be traversed by wagons. This changed the aspect of affairs, and I determined to send Mr. Stanley to the Piegan camp with the interpreter Hammell, and to return immediately with Mr. Culbertson to Fort Benton. I determined also to defer the examination of the Marias Pass to another season. There was not that harmony in Mr. Lander's party which I deemed indispensable to making the examination which I had entrusted to him. Accordingly I ordered him to return with me. Stanley continued on to the Piegan camp, and I started back on my way to Fort Benton. It made a long march for us, for to get a good camp it was necessary to reach the Marias. Our Indian guide, however, made his way pretty directly through to the camp; one and a half hour we travelled in the dark. The descent to the river was somewhat steep and difficult. We succeeded in getting into a good camp about 8 o'clock, when we all came together.

It may be remarked that, before starting on my return, I despatched an express to Donelson to push on with his advanced party, but to keep the main train's track till my arrival. My purpose being, in the event the information brought by Saxton was different from what I expected, to leave the wagons behind and go on with packs, and I wished the train in a position to make the change with ease and despatch.

September 12, 1853.—Started early and pushing rapidly reached Fort Benton about 3 o'clock. Here I learned that, on the arrival of my express this morning, Lieutenant Donelson, who had delayed moving since the 10th, had sent forward a small advance party, and remained in camp himself with the main train, in conformity with my instructions. Lieutenant Saxton arrived at Vancouver on June 27, having been delayed at San Francisco since the first of that month, procuring supplies and assistants. On July 2, Lieutenant Arnold, who had volunteered to accompany the expedition, left Vancouver with most of the stores destined for the depot in Bitter Root valley, with twenty-one men as packers, &c. On account of the high water in the Columbia, he had much difficulty in passing the Cascades, and although everything had to be carried around them on the men's backs, he succeeded, after a week's hard labor, in landing them at the Dalles. Five days after Lieutenant Saxton also reached there, having completed his arrangements and brought an escort of 18 soldiers, under Lieutenant Macfeely, 4th infantry. His party now consisted of himself, Lieutenant Arnold, 3d artillery, Lieutenant Macfeely, Mr. D. L. Arnold, Mr. D. S. Hoyt, eighteen soldiers, twenty-three packers, three herders, two

cooks, and one guide, in all fifty-two; having everything completed, he started from the Dalles July 18, but from the necessity of breaking in wild animals only travelled nineteen miles in the first three days. After crossing Des Chutes river he entered the dry sandy plain, (when the thermometer rose as high as 106° in the shade,) pursuing the emigrant road parallel to the south side of the Columbia, and from seven to ten miles distant. At the Umatilla he was met by a deputation of Cayuse braves, sent by the chief to ascertain his object in passing through their country, they having been told that he was coming to make war upon them and take away their horses. He assured them that such was not his object; that he was sent by the great chief at Washington on a mission of peace to all the Indians, and invited their chief to his camp to smoke the pipe of peace. He did so, promised to be friendly, and said he was glad that their hearts were good. He started with a wagon, which, however, broke down on the third day, and another, which he then bought of an emigrant, broke down before reaching Walla-Walla. The excessive heat and laborious travelling, through sand hills for many miles, caused some animals to give out, and two were drowned in swimming the Walla-Walla river. On the 27th the party arrived at Fort Walla-Walla, 120 miles from the Dalles; finding there that the route direct to Bitter Root valley, by way of the Koos-koos-kia, was very difficult, he determined to adopt the more circuitous one by way of Pend d'Oreille lake.

He engaged Antoine Plante, a guide, a half-breed, who lived with the Spokanes near the prairie intermediate between them and Cœur d'Alenes.

On July 30 they left Walla-Walla, going for twenty-five miles up the beautiful valley of that name; the chief of the Walla-Wallas, Pu-pu-mux-mux, sent a warrior to him from his camp, 45 miles distant, to ask when he wished to cross Snake river. The long march, without water for twenty-five miles, between that river and the Snake was made in the night, and arriving opposite the mouth of Pelouse river, a branch of the Snake, he met a delegation of fifty Pelouse and Nez Percés warriors, who came in full costume and with great formality to have a great war talk. After a smoke, the chief made inquiries as to his objects in going through their territory with so many horses and so much merchandise. Lieutenant Saxton explained that he had been sent by the President to meet the chief of the white men, who was on his way there from Fort Benton; and that he, himself, was going there to see the Blackfeet, and to advise peace; that he had presents for them from the President, and would also pay them well for any assistance given to the expedition. A young Indian made an eloquent speech to the others in reply, in which he said that his father was once chief of all this region; he had extended the hand of friendship to the first white man who was seen in the country, and that they must follow this example. They seemed satisfied with the presents, and were much astonished at the rapid shooting shown them with Sharp's and Colt's rifles, which made a very favorable impression in regard to their means of defence.

On the 2d of August he crossed the Snake, the loads being ferried over in canoes; two of the animals were drowned while swimming across. The Indians carried everything over safely, and were well pleased with the presents made them in return, bringing him corn and potatoes, and promising to kill a fat ox for them when "Governor Stevens should arrive." Although they said that a Spaniard had been along, a few days before, telling them that American soldiers were coming to cut them all off, he satisfied them of the peaceful nature of his journey.

Here his only mercurial barometer was broken, and he was obliged to depend on the aneroid for a profile of the remainder of the route. The country north of the Snake was much superior to that south of the Columbia; and, making long marches in a northwest direction, in three days

and a half he reached the Spokane river, 85 miles in a direct line from the Snake, and about 90 as travelled. The last forty miles was through a beautiful, open pine forest, the trees of immense size, and interspersed with fine lakes and ponds. Here he met with the Spokanes, the most noble tribe he had yet seen, whose chief, Garey, spoke good English, having been educated by the Hudson Bay Company.

They also had been told that his object was to make war upon them, but were delighted to find friends, and came in great numbers to welcome his party. About thirty mounted warriors, in full costume, formed upon a high hill and sang a song of welcome, making the hills re-echo with their wild music; and, as the setting sun shone upon the band, the scene was strikingly grand and imposing. He left with them three disabled horses, to be taken care of until our return, and gave them a few presents, informing them that they were sent to them by the "Great Father at Washington."

Here he met his Mr. Owen, who, with his brother, had spent several years in the Bitter Root valley, trading and raising stock. They had abandoned the post from fear of the Blackfeet, but his arrival enabled them to return and re-establish it.

Proceeding, on August 7th, across the beautiful and extensive Cœur d'Alene prairie, he re-entered the thick forest, the trees in many places being so close as scarcely to admit an animal without a pack between them, and where the animals were much annoyed by yellow wasps, dashing off through the woods and injuring their packs.

On the 10th he reached the outlet of Pend d'Oreille lake, sixty miles from the Spokane, and finding an old batteau of the Hudson Bay Company, after repairing it, made use of it to carry his loads over the river, being about 600 yards wide and very deep.

In crossing several horses were lost, and, to relieve the weaker ones, Lieutenant Arnold took the heaviest articles to the head of the lake in the batteau. Just above the lake he met a party of about a hundred Pend d'Oreille Indians, returning from a hunting excursion to the Missouri, all mounted on fine horses, and carrying the buffalo robes and meat to trade with more western tribes.

They were perfectly civil and seemed to feel proud, rich, and independent. From them he heard rumors of a large party of white men coming from the east, to make peace with the Blackfeet. He describes Pend d'Oreille lake as being a beautiful sheet of water among the mountains. Travelling along the northern shore he was obliged to climb some very steep hills, in order to avoid the water. The whole region is covered with a dense forest of pine, cedar, and other forest trees, similar to New England. On the shore of the lake are many fine meadows, covered with luxuriant grass. At the upper end of the lake he found Lieutenant Arnold, with the boat, who had had a pleasant voyage up the lake, and spoke in the highest terms of the beauty of its scenery.

The next sixty-five miles, along the valley of Clark's Fork, is over a somewhat difficult trail, there being places where the sharp rocks injured the animals. The Cabinet, a high spur overhanging the river, clothed to its summit with a heavy forest growth, was crossed in this distance. The country generally was densely wooded, much of the grass was burned. There is no difficulty, however, in getting sufficient grass for animals along this distance, except for one camp, where the grass is somewhat scanty. In such cases animals scatter very much, and it is difficult to collect them in the morning. In consequence, however, of the mistake of his guide, as to camping places, Lieutenant Saxton was entirely without grass for two nights.

He then reached Thompson's Prairie, a fine tract of meadow land, hemmed in by the

mountains, where the excellent grass makes it a favorite camping-ground for the Indians, and where the Hudson Bay Company formerly had a trading post, which was abandoned on account of the hostility of the Blackfeet. The forest here is open, and grass of good quality grows under the trees. Here, on August 21, the first rain fell since he left the Dalles.

During the next eight days he found excellent prairie camps, and crossing Clark's Fork on a raft, which delayed him for a day, reached St. Mary's village, in the Bitter Root valley, on August 28, where he had the disappointment of learning that the eastern division had not been heard from. On the way tracks of Blackfeet were seen, and the guide, Antoine, felt satisfied that they were watching an opportunity to steal horses. The officers kept strict guard, and, though an alarm was one night given, no trouble was encountered. The lateness of the season and the great losses sustained in transporting the provisions made it necessary to send back from here every man who could be spared, so as to save for the eastern division as much of the stores as possible. Lieutenant Macfeely, though anxious to accompany him to Fort Benton, yet, with a generous devotion to the interests of the survey, consented to take charge of the returning party, and conduct them by the southern Nez Percés route across the Bitter Root mountains near the Koos-koos-kia.

St. Mary's, or Flathead, village was laid out by the Jesuit missionaries, who introduced much instruction in agriculture and other arts of civilized life. They, however, deserted it before completion, and it was finished by the present occupant, Mr. Owen. The Flatheads have a considerable village of log-houses around Fort Owen, and own a large number of cattle, raising also wheat, potatoes, poultry, &c.

Lieutenant Arnold, with his brother and four men, were left in charge of the dépôt and animals, with directions to complete his observations for latitude and longitude.

Lieutenant Macfeely, with nineteen men and twenty-three days' provisions, were to return to Fort Vancouver by the route mentioned, considered shorter but more mountainous than that traversed in coming eastward. Lieutenant Saxton, with seventeen men and the guide, who thought it unsafe to cross the mountains with a smaller party, left the village September 2, on his way to Fort Benton. He says of the country along the Blackfeet Fork, after passing "Hell Gate:" "I think it decidedly a misnomer to call this beautiful region by so unholy a name. The sun does not shine on a better spot on earth, and I found that my previous ideas of the Rocky mountain range were, as far as this section is concerned, entirely erroneous.

"Instead of a vast pile of rocks and mountains almost impassable, I found a fine country, well watered by streams of clear, cold water, and interspersed with meadows covered with the most luxuriant grass."

Passing through a region of similarly fine character, on September 7 he crossed the dividing ridge, which he found but a high hill, and there is not more than a mile in a straight line between the sources of the Columbia and the Missouri.

Nature seemed to have intended it for the great highway across the continent, and it appeared to offer but little obstruction to the passage of a railroad, though from having only an aneroid barometer he could not ascertain its exact altitude. Game abounded on the western slopes of the mountains, but was less abundant eastward.

The next day, September 8, he was agreeably surprised by the arrival in his camp of Lieutenant Grover and his party of nine men, on their way to St. Mary's village, bringing the intelligence of my safe arrival at Fort Benton. He felt rejoiced that the plan of our operations had been successful and the object of the expedition accomplished; as a party from the Atlantic

and one from the Pacific—each in search of the other—had met by appointment, after traversing thousands of miles of unknown country, at the foot of the dividing ridge between the ocean.

Returning together, they reached Fort Benton on the 12th. We were all greatly rejoiced at the arrival of Lieutenant Saxton with information of the country between us and the river waters of the Columbia.

Mr. Tinkham reached camp about eight o'clock this evening, accompanied by one of his men, leaving his party to come in in the morning. The following are the incidents of his trip:

Going up the valley of Milk river on the third and fourth of September, for fifty miles above the Bear's Paw mountain, Mr. Tinkham found it bordered by the same kind of bluffs as further down; steep, irregular broken slopes of clay and sand, destitute of all vegetation, with sandstone out-cropping in layers or blocks; the cotton-wood growth, growing gradually thinner, ceased altogether in the distance of twenty miles, and for thirty miles further perhaps not a single tree is to be found on the river banks. The bed of the river, more dry than lower down, is five or six hundred feet wide, and but a few feet in depth. Water is rarely found, and then only in some hole sheltered by the overhanging bank. All these things, with the almost total absence of animal life, the whistling, drifting sand of the dry river bed, gave to this portion of Milk river valley, in the chilliness of autumn, the character of desolation and dreariness. No point was found so favorable for leaving it as the one at which the main train turned southward by the valley of Elder creek. At Mr. Tinkham's last camp on the river its character was a little improved by the reappearance of cotton-wood trees, luxuriant grass, and sufficient water in holes. He also noticed detached fragments of lignite in some abundance, which may become of value for fuel.

About twenty-five miles further up Mr. Stanley crossed this river on September 12, and found it there studded with cotton-wood groves and undergrowth, and twelve miles further north he crossed a branch of it, then dry, which was said to be the outlet of Lake Pakokee, or "Bad Water," which was eighteen miles long and five broad. Another dry river bed was lined by scattering cotton-wood, elm, wild cherry, and hawthorn. Passing from Milk river valley across the south prairie for twenty-eight miles southwest, on the evening of the 5th he reached the first of the "Three Buttes," and the next morning ascended the two highest and most easterly, which occupied him until afternoon, making the latter part of it on foot. By the barometer, their height was found to be about 3,300 feet, or about 6,700 feet above the sea, and as he left their summits at sunset the thermometer had fallen to 37°, and was still falling. These peaks, standing completely isolated, have long served as watch towers and landmarks to the roving tribes that range over the country for a thousand miles around. Assiniboinés, Crows, and Blackfeet, have marked their summits with monumental heaps of stone, and retained their lodges, in which war parties have awaited the favorable moment to pounce upon the unguarded wanderer in the plains below. They are about half covered with a small growth of pitch pine and spruce, from eight inches to two feet in diameter; the other half consists of grassed slopes, sometimes even extending to the higher peaks, which are covered with a thrifty abundant growth, the favorite sustenance of numerous elk, antelopes, black-tailed deer, big-horn sheep, and hares, all of which were seen more numerous than in the lower country.

Wild cherries and gooseberries, strawberries, raspberries, and blackberries abounded. From the summit the view is highly illustrative of the surrounding country, embracing every prominent object within a hundred miles. On the north, about ninety miles distant, stands Cypress

mountain* far above the 49th parallel; on the east and northeast interminable prairies; on the southeast the Bear's Paw range; on the south various detached ranges beyond the Missouri, and westward about ninety miles is seen the dividing ridge of the Rocky mountains, which forms the boundary of the prairie in that direction. The intervening regions present but few objects to arrest the eye; they are intersected by the various rivers and their branches, which are hidden, even with their edging of trees, in the deep valleys common to them all.

The interesting characteristics of these Buttes apply equally to all the high ranges near the Missouri and Yellowstone as far as they have been explored. While southward they present insuperable obstacles to the direct passage of a railroad westward, thus making the valley of the Missouri indispensable as a route; they, at the same time, by their vicinity to its branches, form inexhaustible sources of supply for excellent timber, and ameliorate the climate around them by increasing the precipitation of rain, which supplies the numerous rivers of this still almost unknown country.

Near the Three Buttes both Mr. Stanley and Mr. Tinkham also found beds of lignite, or coal from three to six feet thick, and of large extent, promising another valuable material for fuel just where it is most needed, near the navigable waters of the Missouri.

On the morning of September 6, after a fall of rain at their bases, Mr. Tinkham found their peaks glittering with a pure white covering of snow, which stretched far down their slopes, and contrasted brilliantly with their dark masses of evergreen growth.

On the 7th, passing between the two peaks which constitute the third butte, he struck across the plains towards Marias river, and did not reach it until the evening of the next day, the distance being thirty miles, over dry rolling prairie, parched, and without water, except what was standing in pools, left by the recent rain. Dry beds of streams were crossed at intervals, showing that at some seasons the rains must be abundant.

Marias river, which he crossed about seventy miles from its mouth, there flows in a channel two or three hundred feet below the prairie level, and is tolerably well wooded. The water was at that time one hundred and fifty feet wide and two to four feet deep, slightly milky, with a swift current and pebbly bottom. The valley is frequently crossed by coulées. It resembles the Missouri in its character of interval and high, steep bluffs, where the main train crossed it at its mouth, and is reported by competent judges to be capable of improvement, so as to be navigable by light steamers for fifty miles.

About eight miles further, in the same direction, he reached the Trunk, a box-like elevation, not very high, but affording a good view of the Rocky mountains.

There he changed his course southeastward, toward Fort Benton, and reached it in a day and a half, the distance being about seventy-five miles by the circuitous route he followed. The country continued prairie, destitute of wood, and with little water except in the streams, which occurred at long intervals, most of the smaller ones being dried up.

Forty-two miles southeast of the Trunk is the Knee, another square, detached hill, about half a mile wide, and looking like a fortress, being accessible at only a few points. It is five miles from the Teton river, on which he encamped, September 10 and 11, to rest his animals, which were much fatigued by their long journey without good grass or water. At that point, thirty-five miles from its mouth, it is smaller than the Marias, where he had crossed that stream, being sixty to a hundred feet wide, from one to three deep, but showing signs of eight feet rise during high water

* A small short-leaved pine, (*P. Banksiana*.) is called cyprés by the voyageurs.—J. G. C.



Stanley del.

J. Bien, N.Y. lith.

MARIA'S RIVER.

It continues much the same further down, and is everywhere fringed with cotton-wood.

Near the Trunk his horse was accidentally killed by the discharge of a gun in the hands of Monroe, the guide, the ball entering just behind Mr. Tinkham's leg.

The reconnaissance thus made in ten days included a route of two hundred miles, and embraced the great plateau between Milk and Marias rivers, for seventy-five miles west of the route of the main party, besides an examination of the Buttes, and of the Milk, Marias, and Teton rivers for a great part of their course, enabling their course to be very accurately laid down. It showed, also, the route generally best adapted for a railroad, should it cross this plateau, instead of keeping to the valley.

September 13-21.—Having now had the advantage of a personal conference with Lieutenants Grover and Saxton, I became satisfied that to insure our reaching the settlements this fall it was necessary to travel more rapidly than was practicable with wagons; and for this reason, and not because I in the least doubted the practicability of taking a train through with comparatively little labor, I determined to move with pack animals. Lieutenant Saxton, from the time of my departure from Fort Benton, impressed me with the importance of not delaying, and he was fearful, knowing that much time would be required on the road to make the necessary examinations of the country, that we might encounter a snow storm, which would give us serious difficulty, particularly as the snow might cover up the grass.

Accordingly, during these days, the necessary arrangements were made to push forward the whole party with pack animals. The public property was stored at Fort Benton, in the care of Mr. James Doty, whom I left in charge of the meteorological post at that point. Mr. Doty was also directed to make all the examinations that he possibly could of the country, and to inquire into all matters pertaining to the Indian tribes. A very important point that he was to impress upon the Blackfeet was the meeting the western Indians in council next year; and he was, under the general instructions of the commissioner, clothed with the powers of a special agent, in order to effect this purpose. I determined at Fort Benton to send Lieutenant Saxton down the Missouri, with his assistant, Mr. Hoyt, Sergeant Wilson, of the engineer department, several discharged men, and all but three men of the dragoon detachment. Had our transportation been sufficient I should have despatched him through the country from the Missouri to the emigrant route, which had been described to me by the Indians as so entirely practicable and as of such a fine character; and for this I had the written authority of the department, which empowered me, on reaching the Rocky mountains and making what surveys I could, to send parties not required for the westward journey home by new routes, still further to explore the geography and resources of the country.

I was exceedingly gratified at this time by the spirit of the men. Several men whom I was afraid had not strength to make the trip, and whom I had first ordered to accompany Lieutenant Saxton down the Missouri, were so anxious to go on that they brought me a certificate from the surgeon, Dr. Suckley, stating that, in his opinion, they were strong enough for the journey, and accordingly I allowed them to go on. We had now been together some three months, and there was great confidence between the several members of the exploration.

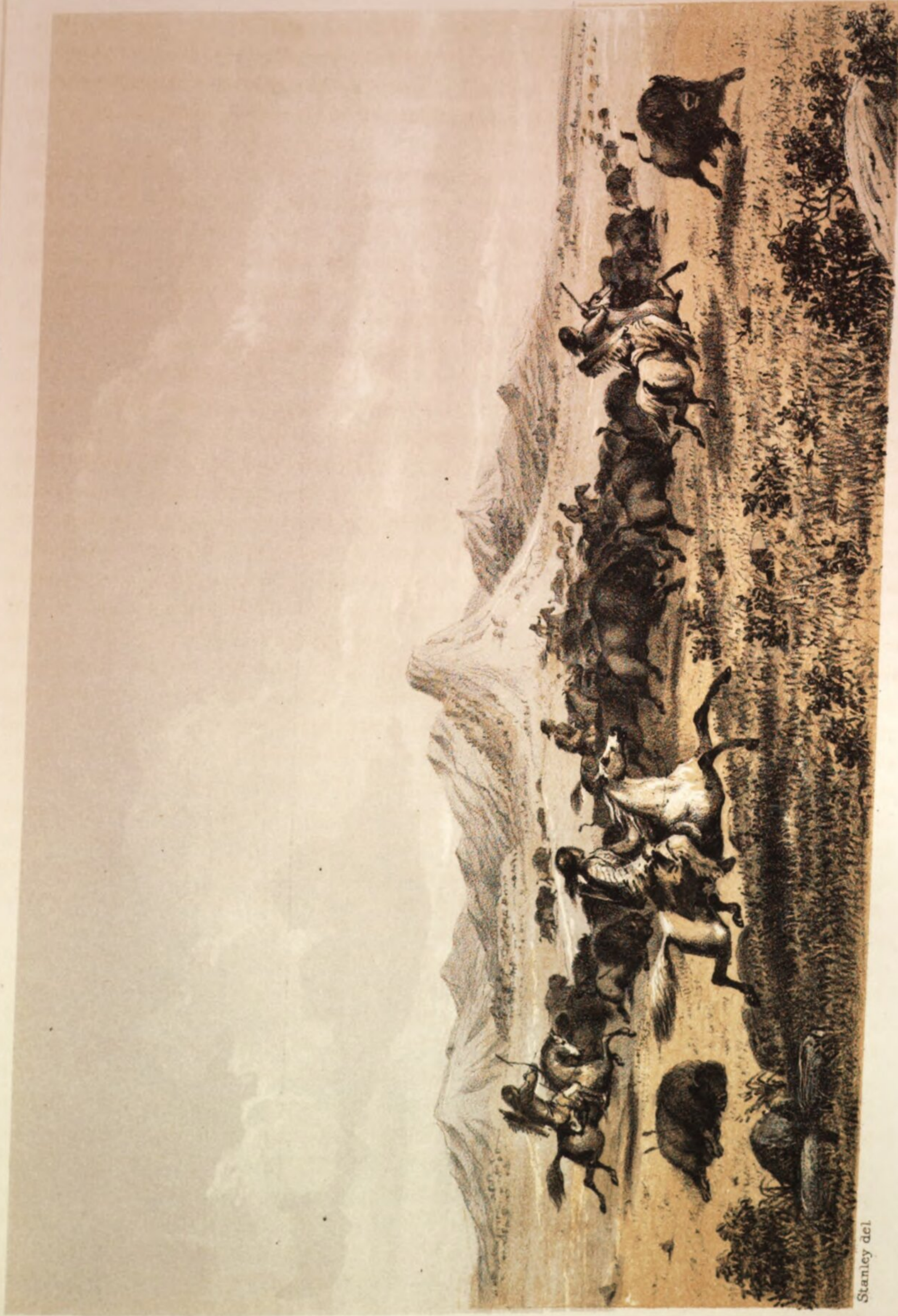
Lieutenant Donelson finally got off on the 16th, and I remained behind in order to hold a council with the chiefs of the Blackfeet, whose arrival from the Cypress mountain was daily expected, and to make up my mail for the department and my friends at home. I will respectfully refer to the first volume of the Pacific Railroad Reports for my detailed account of operations up to Fort Benton, and my plans for prosecuting the survey. From the 16th to the 22d

instant we were very much occupied in fitting out Lieutenant Saxton for his homeward trip; Lieutenant Grover for the survey of the Upper Missouri; in correspondence, and in our council with the Indians. Mr. Stanley returned on the 20th, leaving in camp on the Teton the delegations of Indian chiefs who had accompanied him from the Cypress mountain; and he gives the following account of his visit:

From the camp near Fort Benton Mr. Stanley proceeded on the 11th of September, with three voyageurs and an interpreter of the American Fur Company, guided by Little Dog, one of the chiefs of the Piegans. His course was a little west of north, gradually ascending to the base of the Three Buttes, a distance of thirty-five miles from Marias river. He found them as interesting and full of life as did Mr. Tinkham, the grass around them having all the freshness of spring, and great herds of game feeding on it.

The next day he reached Milk river, thirty miles from the Buttes, and about thirty to the northwest of where Mr. Tinkham had left it. The country in its vicinity was much broken by dry coulees, in one of which he found a stratum of coal or lignite, three feet thick, and running for a quarter of a mile. The valley of Milk river is a mile in breadth, studded with groves of cotton-wood, &c.; and its high borders of table land, broken by ravines, look like buildings and streets of some old city. Here he found three lodges of Piegans belonging to Lame Bull's band, and learned from them that the Piegans had divided their camp. Lame Bull had some days before descended the river, expecting to meet the expedition at the crossing to Fort Benton. Low Horn, with the rest of the tribe, had gone to Cypress mountain. He explained the object of his visit, and made them presents of ammunition and tobacco, for which they were very grateful, giving him fresh and dried meat in return. On the 13th he proceeded towards Cypress mountain, ascending gradually to the summit of the table-land north of Milk river; crossed a high rolling dividing ridge for twelve miles, to the dry bed of a stream having a valley two miles wide. This is the outlet of the large salt lake called Pa-ko-kee, which is about eighteen miles long and five wide. From this he crossed another broken, rocky ridge, for nine miles, and ascending it, halted at an old Indian fort built of logs and sticks. Twelve miles further he encamped, making in all forty miles that day. On the 14th he proceeded twenty miles north, and there reaching the valley of Bow river, which runs at the base of Cypress mountain, he discovered a band of horses towards the west, which he reached eight miles further, and found them to belong to the Piegan band he was in search of, which consisted of ninety lodges, under their chief, Low Horn.

Little Dog conducted him to the chief's lodge, and immediately the principal chiefs and braves, to the number of sixty, collected in the council lodge to receive his message. After hearing his "talk," the chief answered that "the whole camp would move the next morning to hold a council with the chief sent by their "Great Father." The day was spent in feasting with the chiefs, all seeming anxious to extend their hospitality, and, as a delicacy, offering him a dish of buffalo's blood boiled with berries. The next morning the town crier announced the chief's intention to move camp, and the horses being immediately brought in, in less than one hour the whole encampment was drawn out in two parallel lines on the plain, forming a very picturesque scene. Their lodge poles being fastened as a sort of sled, with the small ends tied across the horses or dogs' backs, and the others dragging on the ground, their goods are packed on them, as well as the children and infirm, while some of the women and children also ride on the horses' backs. From three to five hundred pounds are thus transported by each horse, at the rate of twenty miles a day. The dogs each drag about forty pounds. Thus a thousand Indians



Stanley del

J. Bien N.Y. lith.

BLACKFEET INDIANS — THREE BUTTES.

accompanied him as far as Milk river, where the main party remained to hunt, and the thirty principal men, with their families, came with him to Fort Benton, by nearly the same track he had followed in going. In eleven days he had gone 160 miles and back, effected the business he was sent for, made a number of sketches of the country and the Indians, and collected a partial vocabulary.

Cypress mountain thus appears to be in about latitude $50^{\circ} 05'$, longitude $111^{\circ} 15'$. Along its southern base flows Bow river, a branch of the Saskatchewan.

On the 21st instant we held our talk with the Blackfeet. The Piegans, Bloods, and Blackfeet were represented. About thirty chiefs, braves, and warriors were present. They were accompanied by their women and children, the whole party numbering about a hundred. Some principal chiefs of the Gros Ventres, who had accompanied me to attend the council, became impatient at the delay and went back. The council was held in a large room in Fort Benton, appropriated for a council chamber. The interpreter was Hammell, an intelligent voyageur, who had been in the country many years. The interpreter, besides performing his duty of translation, always acts as the executive officer in charge of the Indians. He provides their quarters, attends to their wants, and is responsible for their safety and comfort. The principal chiefs were quartered in the council chamber, and the others had their lodges outside of the fort. On this occasion the chiefs and warriors were all richly caparisoned. Their dresses, of softly prepared skins of deer, elk, or antelope, were elegantly ornamented with bead-work. These are made by their women, and some must have occupied many months in making. The other articles of their costume were leggins, made of buffalo skins, and moccasins, also embroidered, and a breech-cloth of blue cloth.

Their arms were the northwest guns and bows and arrows. On all solemn occasions when I met the Indians on my route they were arrayed with the utmost care. My duties in the field did not allow the same attention on my part, and the Indians sometimes complained of this, saying, "We dress up to receive you and why do you not wear the dress of a chief?"

When the Indians, on the occasion above referred to, were assembled in the council chamber I addressed the Piegans, and first thanked them for their hospitality to Mr. Stanley. Pointing to Little Dog, one of their chiefs, I said: "You have shown your good will to us by going through difficult passes and over bad roads. You have promised to go with us further if we desire it. This shows your good faith, and I sincerely thank you for it." I then said: "I myself have come a great distance, and have passed many tribes on my way to the great ocean of the west. I shall pass through many tribes more, with whom you have waged war for many years. I wish to carry a message of peace from you to them. Your Great Father has sent me to bear a message to you and all his other children. It is, that he wishes you to live at peace with each other and the whites. He desires that you should be under his protection, and partake equally with the Crows and Assiniboines of his bounty. Live in peace with all the neighboring Indians, protect all the whites passing through your country, and the Great Father will be your fast friend."

To this, Low Horn, the principal Piegan chief, replied on behalf of the Indians. He first spoke of the Indians west of the mountains, and said that many years ago they had formed a treaty of peace with them, and for a long time were on excellent terms with them, meeting each other and hunting together on the Missouri plains. He said that the prominent chiefs of all the bands had adhered to that treaty, and had done all they could to restrain their young men; but their young men were wild, and ambitious, in their turn, to be braves and chiefs.

They wanted by some act to win the favor of their young women, and bring scalps and horses to show their prowess. He added: "The Blackfeet are generous and hospitable. They always forgive injuries. Some years since, after a Blackfoot had been killed by a Gros Ventre, several Gros Ventres fell into our hands. These Gros Ventres all expected to be put to death, but we fed them, treated them kindly, and gave them horses to carry them home."

I then interrupted him and said: "I know this to be true, for the Gros Ventres told me of it themselves. When they told me this, I said it was a reason why they should not go to war to avenge the insult from you of which they complained." I then said to them: "Why is it that you have two or three women to one man? Is it not because your young men go out on war parties, and thus the flower of your tribe is cut down? And you will go on diminishing every year until your tribes are extinct. Is it not better that your young men should have wives and children and that your numbers should increase? Won't your women prefer husbands to scalps and horses? The Gros Ventres desire to meet you in council and have the difficulties between you arranged. Will you meet them in council?" They answered "We will." I continued: "What words shall I take to the Flatheads, the Nez Percés, and other tribes with whom you have difficulties on the buffalo plains?" They answered that they would meet them in council, and desired to live on terms of peace with them. I asked them if they would cease to send war parties into the Flathead country before the council was held. They said they could not speak for those of their tribes who were not present, but would promise themselves, and carry my words to other members of their tribes.

In conclusion I told them "that I had learned much of them from Mr. Culbertson, who had married one of their women. I go west to see the other tribes; but Mr. Culbertson, whom you know to be your friend, will go down the Missouri and tell the Great Father what you have promised. I leave with you Mr. Doty, who will mingle with your bands and get acquainted with your people. This young man's father, (Governor Doty,) who was a great chief, spent a long life among the Indians and always treated them with justice. You will be a friend to this young man, as his father was a friend to your people."

Before the breaking up of the council I distributed presents of the value of about six hundred dollars, with which they were greatly pleased.

While in the council, Low Horn, the principal chief and speaker, made all his replies without rising from his seat, and in a quiet conversational tone. After the council he assembled his braves and resumed the lofty bearing of a chief. He addressed them with great fervor and eloquence; commanded them to cease sending out war parties henceforth, and threatened them with severe punishment if they disobeyed.

It will not be uninteresting here to state that Low Horn, the quiet and even meek spokesman at the council, and the trumpet-toned chief in the presence of his men, crossed the Missouri in 1855 with his whole band, moved up the Judith, and camped on the Muscle Shell—the first man who extended the hand of welcome and friendship to the western Indians as they crossed the mountains on their way to the council, showing, most conclusively, that faith can be put in Indians; for it must be recollected that two years passed away from my conference with the Indians at Fort Benton, in 1853, to their reassembling, in 1855, at the council appointed two years before. I will here remark that on the 18th of September I had a special council with various young men of the Blackfeet tribe, who had come from the south, where they had gone in search of horses, and were on their way to their northern homes; and in every case this idea of

peace between the Blackfeet and their hereditary enemies, and between both and the white children of the Great Father, was received with the greatest delight and satisfaction.

September 22.—This morning we bade adieu to Fort Benton and separated from the portions of the expedition who were assigned to duty east of the mountains. Before sunrise we saw Lieutenant Saxton off in his keel-boat, drawing eighteen inches of water, accompanied by Mr. Culbertson, who was directed by me to report to the department at Washington and to urge the importance of the Blackfeet council. Lieutenant Grover, on a smaller craft, commenced his minute examination of the Missouri. Mr. Doty, who had won very much upon me by his intelligence, his fidelity, his promptitude, and energy of character, parted from me with feelings of hope and pride at the idea that now a field was opening to him where he could be useful to his country and could make a reputation for himself. I take this occasion, in parting from Mr. Doty at Fort Benton, to pay an humble tribute to his worth and services. He is now no more; but he was my friend and companion at the great council held in 1855, where he acted as secretary of the commission. Twice did he traverse the country with me from the Pacific to the Missouri. Unwearied, indefatigable, and able, his services were felt, not only in our Indian duties, but in developing the geographical resources of every portion of the country which he had an opportunity to observe.

As we left the fort, soon after sunrise, we felt that our short sojourn there had not only let us into the experiences and vicissitudes of life in a remote mountain post, surrounded by numerous Indians, and accessible to information from home but once or twice a year, but we felt also that we had made warm and fast friends of all the inhabitants of that region—voyageurs, Indians, and gentlemen of the Fur Company. And I ascribed it mainly to one reason, that they felt that beneficent results would flow from the expedition, and they saw that every man was thoroughly in earnest in furthering it.

In order to make a long march this day, the evening before I had dispatched my train to a point well up the Teton, some twelve miles from Fort Benton, and there Mr. Osgood and Mr. Stanley, who had remained behind with me at Fort Benton, and myself breakfasted with the rest of our party. I will here remark that Dr. Suckley, who had started with Lieutenant Donelson in the main train, and who had left it on the second day in order to visit the falls, was not able to find their track, and consequently returned to Fort Benton. He, and Messrs. Evans and Kendall, who had assisted me in my correspondence, were the additional members of my party.

FORT BENTON TO BITTER ROOT RIVER.

The whole party moved off at nine o'clock, continuing for some distance up the valley of the Teton, when we ascended a hill to the prairie, and in 21 miles reached a coulée, where there were springs of water sufficient for our animals. Large bands of antelope were seen on the road. We struck the Prairie Lake at 5 p. m. The water of the lake is excellent, but there is no wood. Our guide, the voyageur Baptiste Champaign, took us to the nearest point of Sun river, hoping to get in before dark; but we did not reach camp till some time after dark. Over the route to-day the grass was uniformly good, and much of the land was arable. There is a somewhat steep descent to the valley of Sun river. We found near our camp an excellent spring of water; and the water of the Sun river itself is exceedingly transparent and pure. I have travelled over this plateau between the Teton and Sun rivers on two other lines, and the view at almost any point of the plateau is exceedingly picturesque and suggestive. Whilst the

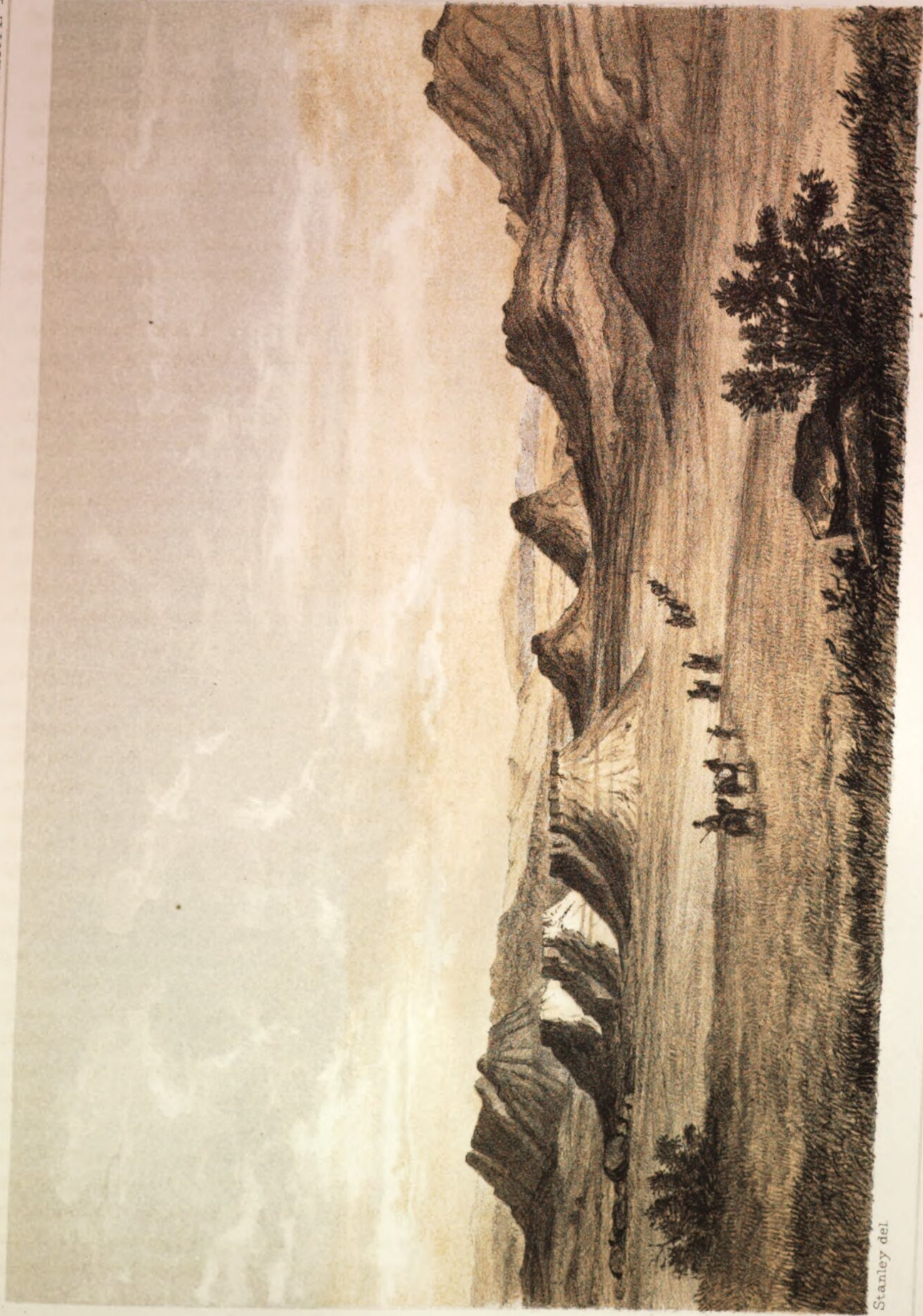
main chain from the Rocky mountains view have but little wood, there are large quantities of timber on the chains and mountains south of the Missouri, in the Bear's Paw and on the Three Buttes. The various minor upheavals and swales of ground, which here and there dot the surface of the country, have connected with them some story of Indian war, wrong or suffering. This whole country was once occupied by the Snakes, and, in later times, by some of the tribes of the Flathead nation. It belongs now to the Blackfeet by conquest, as was stated in open council at Fort Benton, in 1855, by the Pend d'Oreille chief, Alexander, who claimed it as the land of his fathers.

September 23.—Moved up the valley of the Sun river, having made an early start this morning. The Sun has a wide open valley; grazing exceedingly good, and the soil excellent. One of our Indian guides now left us and returned to Fort Benton.

In 16 miles crossed Sun river, near the point where it had been crossed by Lieutenant Donelson, who had preceded us. We continued up in the direction of the pass between the Crown Butte and the Rattlers, prominent landmarks west of Sun river, and visible at a great distance. This is a favorite resort of deer, antelope and bighorn. They were present to-day in very large numbers. All through this country the grass is exceedingly nutritious. This is shown by the resort of animals and their condition. Continuing on we came in view of the Bird Tail rock, so called from its peculiar appearance. Immediately to the west, in a line near it, is another landmark, known as the Piegan's Tear. After making some forty miles, we found a camp a little off our route, in a most delightful valley, a spring of water gushing out near by, and the remains of an old camp of the Blackfeet at hand, furnishing us with fuel already prepared to our hands. On our way to camp our guide pointed out to us an excellent wagon road to the south of our trail.

September 24.—Started as usual very early this morning, and in four miles came to Beaver creek, a very beautiful stream of water. This stream is now full of beaver, and is much obstructed by their dams. The country is somewhat more broken to-day than it was yesterday; timber comes in view on the tops of the mountains, and the scenery becomes more grand each mile we proceed. Three miles beyond Beaver creek, a high peak, called the Goose's Neck, comes in view to the south of us; at the southern foot of which equally as good a road is found, though some two days longer, as the one now being travelled by us. It is a branch of the present trail, and is usually pursued by the Flatheads on their way to Buffalo. That trail is called the Flathead, and our own the Blackfoot trail.

We now crossed several mountain streams in the course of a few miles, and in sixteen miles we struck the Dearborn river. At noon, moved forward to the dividing ridge, which we reached at 4 o'clock. To this point our road, from near the Dearborn, lay over sideling hills and through timber. As we ascended the divide a severe, pelting rain and hail storm, accompanied with high wind, thunder and lightning, suddenly came upon us, and did not abate until we had reached the summit. The wind blew very high, and the mist resulting from the storm prevented our getting a very clear view of the country before us. It was with great gratification that we now left the plains of the Missouri to enter upon the country watered by the Columbia; and it was the more especially gratifying to me as, looking to my future duties in the Territory, I felt that I could welcome to my future home and the scene of my future labors the gentlemen of my party, which I did very cordially and heartily. I will observe that the scenery throughout the day's march, up to the divide, has been picturesque in the extreme; and the latter portion of it, from the entrance proper to the pass, our road passed



Stanley del.

J. Bien N. Y. lith.

APPROACH TO CADOTTE'S PASS.

between hills on every side covered with timber, on the sides of which we are constantly travelling; while many feet below are to be seen the small upper tributaries of the Missouri, flowing from their source in a valley that is very wide for so small a channel, and lined with verdure and the foliage in yellow leaf. All this made a combination full of interest to the eye of one who could appreciate the beauties of nature.

The ascent from the eastern base on the Indian trail is somewhat steep, though, in 1855, I gained the summit by a large, wide, open ravine north of the Indian trail, by a very gradual ascent and without much increase of distance; I was a good deal surprised to find how little an obstacle this divide was to the movement of a wagon train. Had we gone on with our wagons there would not have been the slightest interruption, up to the entrance of the pass, to making the usual journeys each day.

In the pass, which may be considered some eight or nine miles long, there would have been some work, for many coulées run down into the tributaries of the Missouri, whose general valley we pursued, which would have to be bridged, or the banks on either side slightly dug away and improved; but even this amount of work, to parties experienced in encountering the difficulties of the prairie, would have been of trifling consequence. We were twenty minutes simply descending on the western side, which was somewhat more steep than the eastern. Continuing on, we followed the valley of the Blackfoot river some ten miles and camped in good grass, with excellent water and abundance of wood. It may be generally remarked that, since leaving Sun river, no difficulty has occurred in finding excellent camps, with plenty of wood, water, and good grass. Shortly after getting into camp it commenced raining, and continued raining steadily all night; the weather raw and cold.

September 25.—Raining hard this morning. The animals having strayed some distance detained us; not getting off till 8 a. m. The first fourteen miles was through an open, wide and beautiful prairie, after which much of our way was through wood, when fallen timber offered serious impediments to our rapid progress. At times through the river bottom, and low brush and willow growing around us made it necessary to use our arms to open the brush in making our way through it.

At 1 o'clock Stanley and myself, having gone rapidly ahead, had a big fire built to receive our party as they came up. Here we lunched. By 3 o'clock the clouds were breaking away and the rain had ceased. Crossed several hills to-day, travelling on the sides of some of them. Just before we came out on the prairie on which we found Lieutenant Donelson and the main party encamped, we were six hundred feet above the level of the river. On the sides of the hill below us was growing the mountain pine; in the valley beneath, right at the base of this hill, was the clear, rapid stream; beyond was the foliage of the trees growing in the bottom. The tops looked like a green, rich carpet; further were wide sections of prairie, all bounded by a high ridge of beautiful hills, altogether forming a scene of surpassing beauty. At 5 p. m. we reached Lieutenant Donelson's camp, and found we had travelled about one hundred and forty-four miles since leaving Fort Benton.

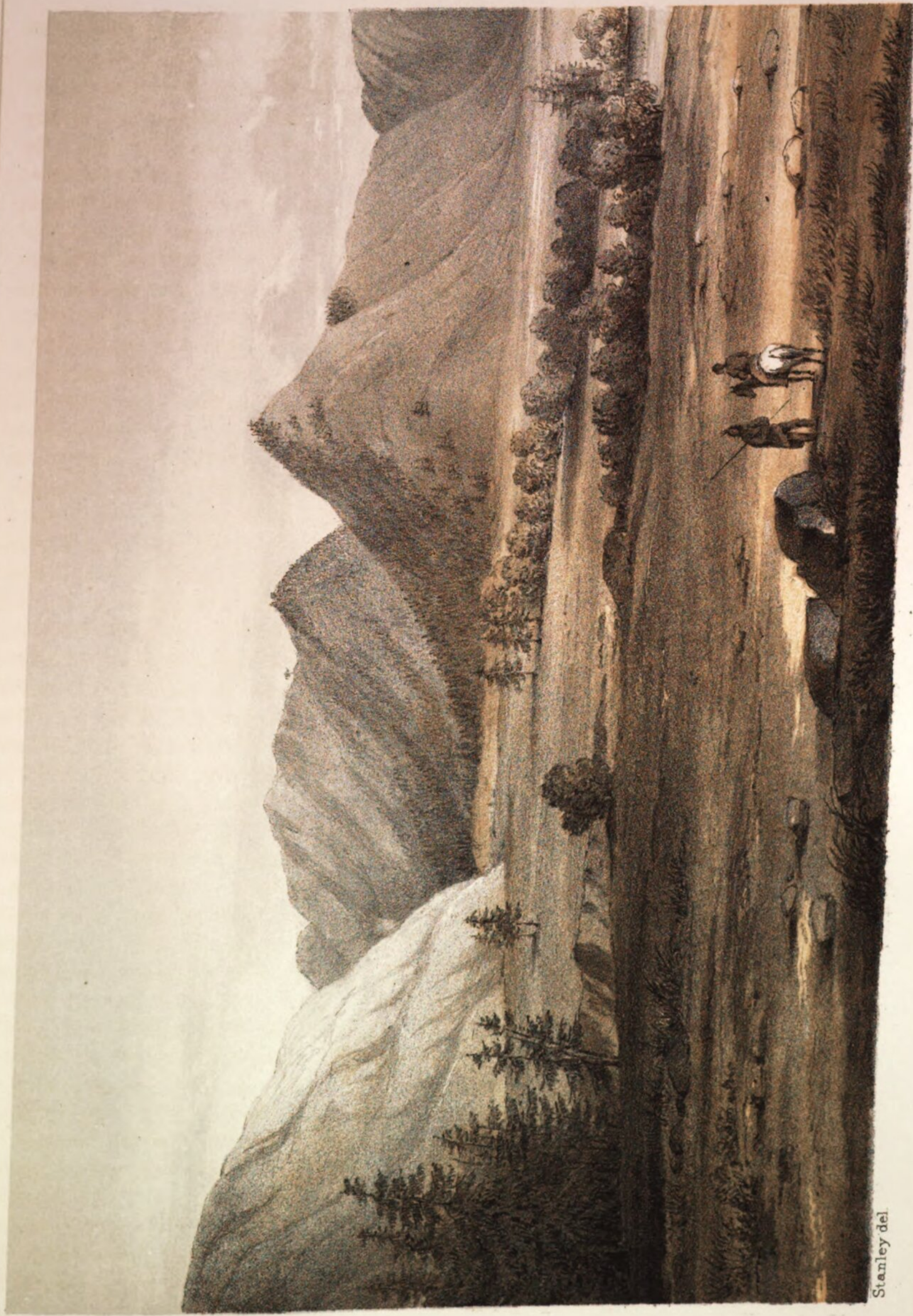
I conferred this evening with Lieutenant Donelson in regard to the continuation of the survey through the Bitter Root valley. He was exceedingly desirous to despatch Antoine Plante across the low divide lying between us and the Hell-Gate fork of the Bitter Root, to search for the gold mine which was known to exist on one of the tributaries of the latter river. It was well known to us that the Indians of that country reported very rich gold mines at different points; and our guide, Antoine, was of opinion that he would have no difficulty in finding the place.

But it seemed to me, the season being late, that it would be better that this examination should be made by Lieutenant Mullan, who would have ampler opportunities and more time to do it thoroughly; and accordingly I directed Antoine to accompany me to the Bitter Root valley. Near our camp, the Blackfoot fork branch, the valley was very wide and open, and the country in view between us and the Hell-Gate was generally a rolling, well grassed prairie. Mr. Tinkham had been despatched by Lieutenant Donelson, on reaching the Sun river, to make an examination of its upper valley, and the country thence under the base of the mountains, to Cadot's Pass, with a view of laying down a line of easy grades to the mountains.

In the execution of this duty he proceeded up the valley of the Sun river to its forks; thence continued on to the Dearborn; and thence made his way to the entrance of Cadot's Pass. Although his provisions were giving out and his party were on short allowance, he made a very thorough and satisfactory examination. As I approached the divide I found one of his camps, showing that he had preceded me but two days. It is a source of much regret to me that it was impracticable to delay the party to run a line of spirit levels over the difficult portion of the route in the neighborhood of the mountains, and over the pass itself. Some twenty miles down the valley I came across one of Mr. Lander's camps; and I learned, on joining Lieutenant Donelson, that he had not reported to him on his approach to the mountains, as was expected, but had probably preceded him to the Bitter Root valley.

September 26.—The gentlemen not required by my rapid trip to the westward—namely, Dr. Suckley, Mr. Evans, and Mr. Kendall—now joined to the main party, and we pushed on over the Blackfoot prairie, (called in Lewis and Clark's Narrative the Prairie of the Knobs,) and after a march of thirty-odd miles came to a beautiful camp, near what is known in the country as the Cañon. To show the condition of the animals of the expedition, I will observe that, as I passed by the mules of the supply train, (for I remained somewhat late in camp this morning to confer with Lieutenant Donelson, the whole party being several miles on the march before I started,) I observed that their rate of travel, on a fast walk, was from four to four and a half miles per hour; and the advance of the train moved thirty miles that day, getting into camp early, and the animals apparently not fatigued. We had hardly made up our camp-fire, when, seeing a black bear and two cubs close by, we felt sure that we should have bear meat for supper; but, although all the voyageurs were on their track, they finally made their escape.

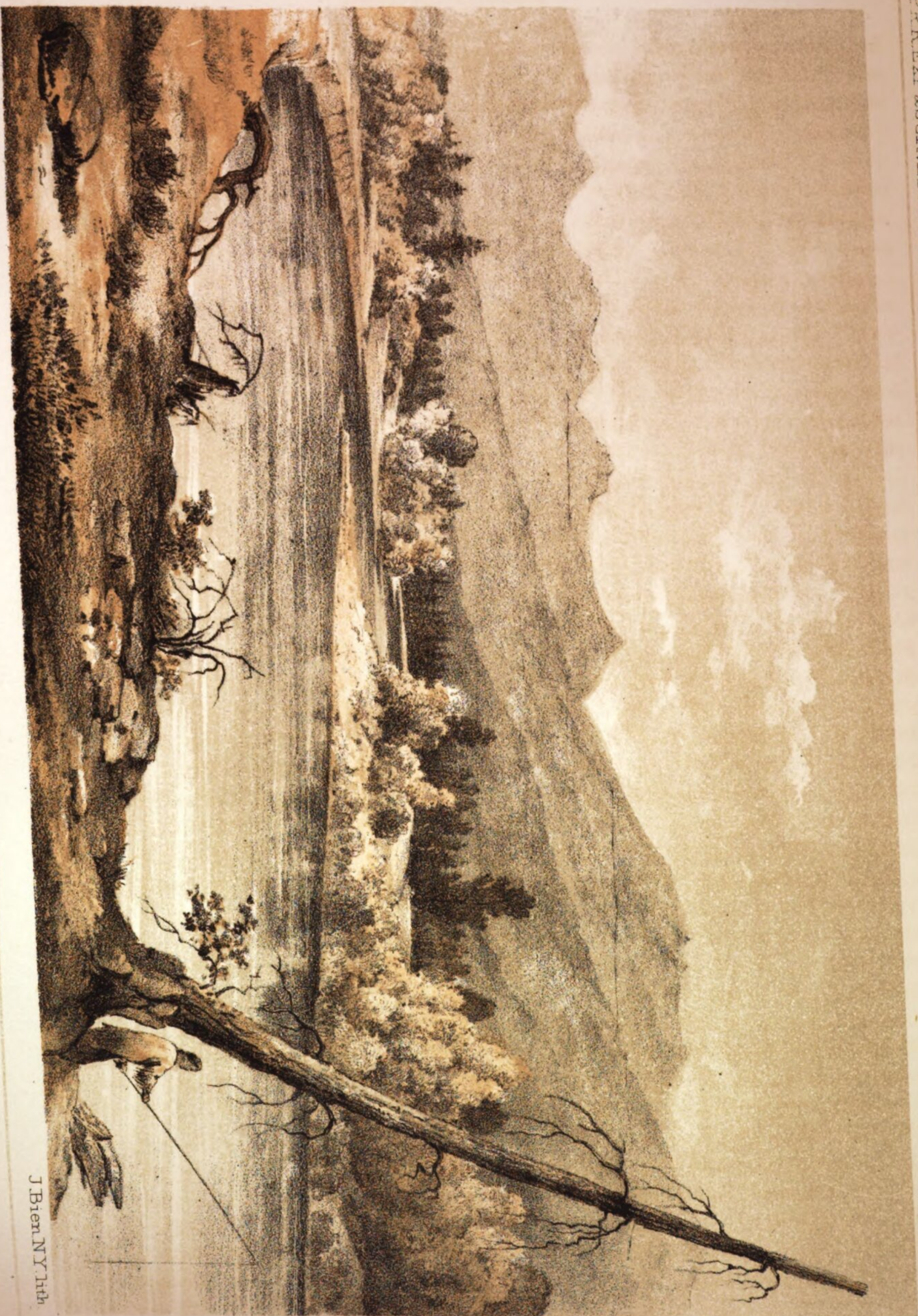
September 27.—We started about seven o'clock, and soon entered the Cañon; not, properly speaking, a cañon, for throughout its extent, until you reach the *debouche* of Hell-Gate, there is no special difficulty on the trail, nor would there be excessive work to open a good wagon road. But a good many sharp spurs come down close upon the river, throwing the trail well back, or involving a crossing of the stream to avail one's self of the prairies invariably found opposite one of these spurs. Much of the country was of a very excellent description, abounding in timber, well watered, and the soil of an excellent quality. A much better road would be found by leaving the trail of yesterday some ten miles before reaching our camp, crossing the Blackfoot river, keeping on its south bank and coming into the immediate valley of the Blackfoot, nearly two-thirds of the way down the cañon, and only six miles from the junction of the Blackfoot and Hell-Gate forks. Emerging from the cañon we come into a wide, open valley, commencing half a mile before reaching the mouth of the Blackfoot, continuing down the valley of the Hell-Gate until we enter the Hell-Gate ronde, a large, extensive tract of many miles in circuit, and where the Hell-Gate joins its waters to the Bitter Root. Crossing the



Stanley del

J. Bien N. Y. lith.

HELL GATE.—ENTRANCE TO CADOTTE'S PASS FROM THE WEST.



Stanley del.

BITTER ROOT RIVER NEAR FT. OWEN.

J. Bien. N.Y. lith.

Hell-Gate at a good ford, we continued up its valley and reached a most excellent camp on the west side of the Hell-Gate, some twenty miles from Fort Owen. We observed a trail passing over the side-hills east of the Bitter Root river, which is pursued in high water.

September 28.—Started at half-past seven o'clock. Keeping up the west bank of the Bitter Root river we crossed two streams—one the Traveller's Rest creek of Lewis and Clark, passing through a grove of pine timber; when, in $12\frac{1}{4}$ miles, we crossed the Bitter Root river, just before reaching which we met some Indians from Fort Owen; and after crossing we met Lieutenant Arnold, on his way to Victor's camp. Lieutenant Arnold returned with us, sending on a messenger to attend to his business with Victor; and about noon we reached Fort Owen, where we met the other gentlemen of Lieutenant Arnold's party. I found Mr. Lander in camp near Fort Owen, and learned that he arrived the day before yesterday. Mr. Lander, on receiving his instructions to report to Lieutenant Donelson for duty, in examining the approaches to the mountains, was directed by him to move at once, with his party encamped on the Marias, in execution of that duty. He ran a line from the Marias to the Teton, and thence to the Sun river, crossing it at the island some six miles below the forks. Between the Teton and the Sun river he killed the first grizzly bear, near a lake named, in consequence, Grizzly Bear lake. From the Sun river he continued his examination to the upper waters of the Dearborn, and thence immediately under the foot-hills of the Rocky mountains to Lewis and Clark's Pass; it being the pass pursued by Captain Lewis on his return trip. Mr. Lander being provided with a suitable assistant and the necessary instruments, took some observations in order to determine the height of this pass, the grades of a railroad, and the amount of tunnelling required. Crossing the divide, he continued down for seven miles a stream which flows immediately from the pass, and for this distance has an almost straight course in the valley, with a remarkably uniform descent of a width seldom less than a quarter and opening to three-quarters of a mile. He then abandoned the examination of the pass furnished by this stream, and continued on the Indian trail over two low divides to a large tributary of the Blackfoot; down which passing four miles he came upon the Blackfoot fork. After continuing on for some distance down the valley he left the valley and passed over the divide to the waters of the Hell-Gate river; mistaking the Hell-Gate river for the Bitter Root, he moved up the valley of this stream, expecting to reach the St. Mary's village, when again he turned from it, and crossing over a series of divides and crossing a number of streams, he entered the valley on a known Flathead trail immediately east of Fort Owen. In consequence of the route taken by Mr. Lander, and his animals having been much pushed, they came in exceedingly jaded, although he started with the best train of the whole party. He was unable to make any observations whatever bearing upon our railroad line, excepting for seven miles of the divide, a short distance thence down the Blackfoot valley and small portion of the Hell-Gate valley. All these facts did not come to my knowledge until a long time subsequently, and I deem it simply an act of justice to the expedition that they should be presented in this narrative.

Fort Owen is situated on the Scattering creek of Lewis and Clark; and I would earnestly urge all persons desirous to know the minute details of the topography of this valley to study carefully the narrative of Lewis and Clark; for to us it was a matter of the greatest gratification, with this book in hand, to pass through this valley and realize the fidelity and the graphic character of their descriptions. Lieutenant Arnold had been jerking beef against our arrival, and making all arrangements to enable us, without delay, to push on westward. I examined very carefully into the condition of the train left by Lieutenant Saxton, and of the provisions brought to this

point, and had every reason to congratulate myself for having assigned to him this undertaking. We found there nearly two thousand rations, but the animals were very few of them serviceable; yet, from their appearance, it was obvious that none of them would continue unserviceable for a considerable length of time, and I believed they would be entirely equal to any service which Lieutenant Mullan's duties might require of them.

September 29 to October 3.—During these days we were all occupied in making arrangements for the movement of the parties westward, and to establish Lieutenant Mullan's winter post. Lieutenant Donelson arrived on the 29th, with the main party, and Lieutenant Mullan on the 30th, with a delegation of chiefs from the Flathead nation.

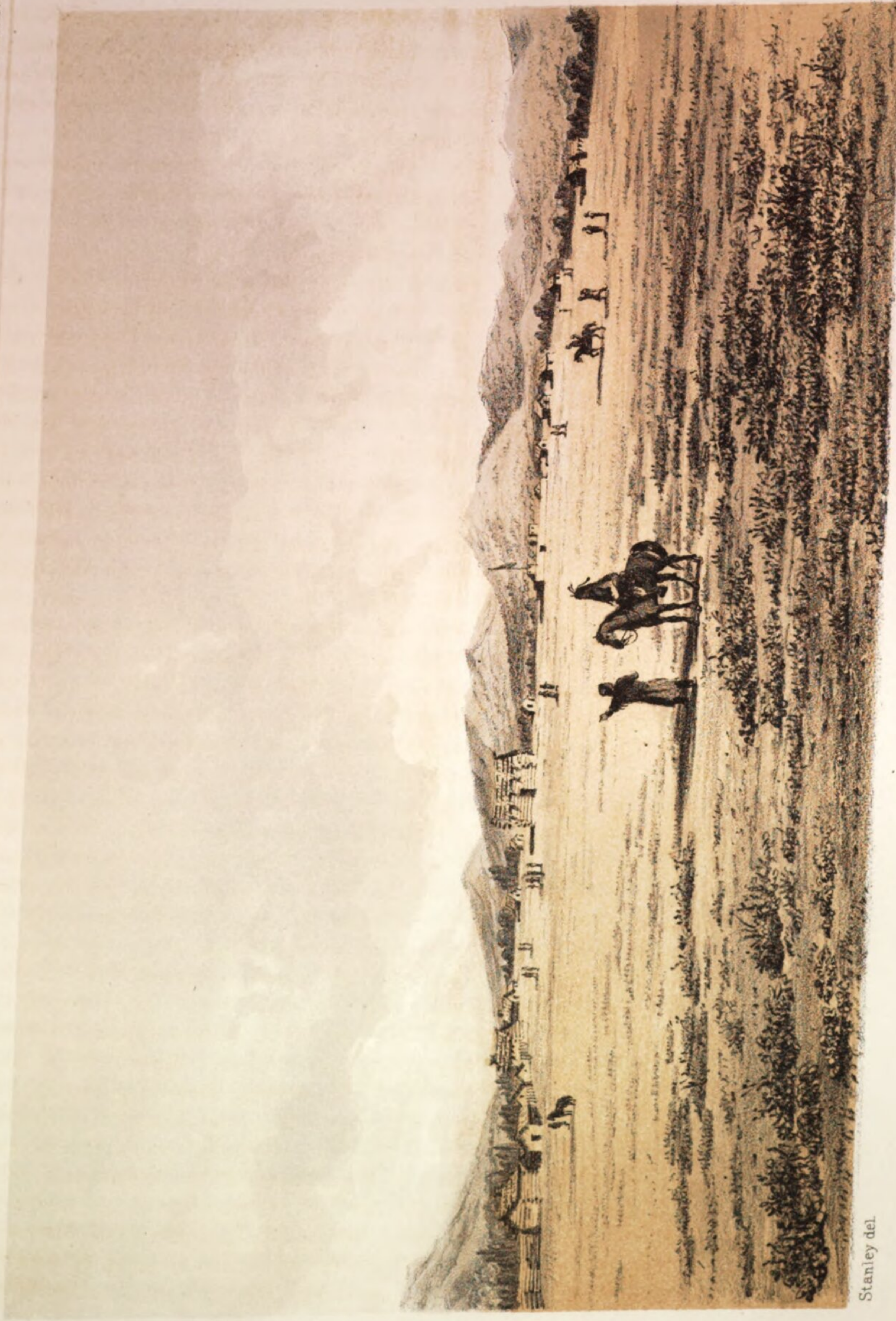
Lieutenant Mullan, leaving camp near Fort Benton on the 9th of September, forded the Missouri five hundred yards below the fort, where the water was two and a half feet deep, took a southerly course to the foot of the Belt or Girdle mountains, which he reached after going twenty-two miles. Part of the route was along a small, shallow, and winding stream called Shonkee creek; which, however, showed signs of being sometimes thirty feet in depth. Grass was luxuriant in its valley, and at its head pines of large size were abundant. The first spurs of the range known as the Highwood are a thousand feet in height, and abundantly wooded.

The branches of Arrow river were next crossed near their heads in the mountain spurs, having beautiful valleys, wooded along the stream. On the 11th and 12th he crossed six branches of Judith river, and followed it to its head in the spur called the Judith mountains. These were also well wooded with pine, and of moderate elevation, and on crossing these the lofty snow-clad peak south of the Muscle Shell came into view.

Small tracts on some of the branches of Judith river had the desolate character of the *Mauvaises Terres*, particularly on Arrow river, where the ravines were perfectly awful to behold, descending to the depth of many hundreds of feet; the cliff black, barren, and destitute of timber, being composed of a mixture of sand and clay, the latter predominating. Granite and sandstone of excellent quality exist in the Girdle mountains, and a bed of salt was seen near their bases.

The whole country was found to be beautiful; a level plateau between the Girdle and Judith mountains, traversed by the numerous branches of Judith river and covered with excellent and *high* grass. Innumerable herds of buffalo were feeding near the mountains, and the small ponds swarmed with geese and ducks. The climate he compares to that of May in Virginia, and frequent rains, chiefly at night, were beginning to renew the growing season and the verdure of the plains. Near the mountains the streams were always wooded with cotton-wood and wild cherry. Cedar grew on the lower bluffs, and the mountains, from their bases upward, were clothed with pitch and yellow pines, attaining a height of seventy-five feet and a diameter of one to two feet, besides a species of spruce.

Thirty miles from the Judith range he crossed the Muscle Shell on the morning of the 14th, the stream being fifty yards wide, from two to five feet deep, and with a very rapid current. It winds through a beautiful valley, ten miles wide, covered with excellent grass, and the drift wood showed that the river in high floods reached a width of one hundred and twenty yards. Not finding the Flathead camp, or any signs of their trail, he followed up the stream four miles, and found trace of their having gone down. He then traced them for nineteen miles down stream, and passed two deserted camps, when they were found to have crossed the river. After going several miles over a rocky ridge three hundred feet high he made camp, and next morning, taking only the Piegan guide, started in search of them; and, after getting about fifty miles south of the Muscle Shell, again met with a beautiful prairie country, dotted with lakes, but



Stanley del

J. Bien N. Y. lith.

FORT OWEN - FLATHEAD VILLAGE.

without streams of running water for considerable distances; and *eighty miles*, by his estimate, from where he started in the morning, and about seventy miles south of the Muscle Shell, he found the encampment of Flatheads. Having been unsuccessful in procuring an interpreter to accompany him, he was without the means of communicating with them. Fortunately, however, one of the Flatheads could speak French, and he acting as interpreter, Lieutenant Mullan explained to them the object of his visit; that he had a message from their Father, who desired them to send some of their principal men west of the Rocky mountains to hold a council with him; that the intention was to do them good by making a firm peace with the surrounding tribes, and by supplying them with the means of cultivating the land, &c.

They received him in a very friendly manner, and astonished him by having prayers at his arrival, as well as in the morning and evening, the whole tribe being assembled in the chief's lodge. After hearing him, the chief told him that in the morning he would give him an answer. The next morning, after much persuasion, he consented to send four of his principal men, who accompanied Lieutenant Mullan to his camp, where they arrived next day. There were altogether 150 lodges, 50 of them Flatheads, the remainder Pend d'Oreilles, and, though plainly showing the good influence of the missionary instruction, they still were complete Indians in their love of finery, and in the state of drudgery in which they kept their women.

Returning to the Muscle Shell from the Flathead camp, he followed it up to the head of its north branch, and, crossing the dividing ridge there, a grassy prairie, descended along the headwaters of Deep (Smith's) river to the Missouri. The country passed over here was more rugged, mountains rising one thousand feet above the streams; but they were always well wooded with large trees, among which the hemlock spruce appeared. Near the Missouri they were composed of a dark blue slate, changing lower down into red and green slate, under which is a rugged cream-colored rock. Antelope were abundant, and fine trout, two feet long, were caught in Deep river. Here, almost at the sources of the Missouri, and above the "Gate of the Mountains," the valley was eight miles wide, and a most beautiful, well-grassed prairie extending on each side of the route as far as the eye could reach. Far to the south lay a high mountain range, the most distant peaks snow-clad, and, in the bright sunshine, glistened like mountains of silver.

This Piegan guide deserted him at the Muscle Shell, but the Flatheads showed a perfect acquaintance with the route mentioned. The main stream of the Missouri was here rapid, clear, and tortuous, near two hundred yards wide, the channel being six or eight feet deep, shut in by mountains on the west and hills on the east, causing numerous rapids in its course. Cottonwood and willow are the only trees on its banks.

Crossing a rough but low ridge west of the Missouri, he again entered a large level prairie, which further up opens on the Missouri, and is said by hunters to have an excellent communication for wagons with Fort Benton along that river. This valley was eighteen miles wide, and, crossing it, he followed up Prickly Pear creek for ten miles, finding the road good but tortuous, and encamped at the foot of the dividing ridge of the Rocky mountains. In crossing the mountains, on September 24, he went up a steep mountain of the dividing ridge, which was about one thousand feet high above the bottom of the valley. This particular mountain was not practicable for wagons; though he was informed there is one which, crossing the prairie referred to, crosses the mountains a few miles further to the north by a very easy and gradual ascent and descent, the only obstruction being the timber and the loose rocks and stones. At the western base of the mountains the valley of the Little Blackfoot Fork is, for some distance,

from a mile to a mile and a half wide, and covered with a rich growth of very nutritious grass. Its branches also flow through prairies, and the hills on each side are high, undulating prairie, their summits occasionally covered with timber. Toward its junction with Hell-Gate river the Little Blackfoot becomes twenty-five or thirty yards wide, and its valley continues wide and open. The Hell-Gate below this point is eighty yards wide and two feet deep, and above the mouth of the Little Blackfoot takes the name of Deer Lodge creek from the prairie through which it flows. Rolling prairie continues along its valley nearly to its junction with the Big Blackfoot Fork at Hell Gate defile, and the road is good the whole distance. From Hell-Gate to the Bitter Root valley he followed the route of the main expedition already described.

On the 30th of September and the 1st of October I had conferences with the Flathead delegation. The principal men of the delegation were Pacha, Finissiant, and Palassois, three Flathead chiefs, and Cohoxolockny, a Nez Percés. They were invited into a room, and took a smoke all around. I then told them of my having sent to their seven lodges, and of the Indians having, the evening before, returned with Antoine, and having a talk with me. That the chief, Victor, had returned to-day in consequence of the illness of one of his children, but Adolph was still here with the remainder. I said that, since Lieutenant Mullan left Fort Benton, I had seen the Blackfeet, who solemnly promised to give up waging war and stealing horses. They would also endeavor to restrain their young men. I thought that in the future they would conduct themselves more peacefully. Palassois replied that, when the master came to their camp, the Pend d'Oreille's chief said to them, Go to St. Mary's, see the Father, listen to what he has to say, and return and tell me. I then asked when they would return to their chief. To which they replied, to-morrow. I then told them I would tell them to-morrow what word they should carry to their chief. I had business which required my absence now; but in the morning I would see them, and wished to see Adolph and his party with them. They then received each a piece of tobacco, and had another smoke and talk among themselves. Finissiant and Palassois are relatives. They are old sages. Palassois is a great hunter. He has kept the party supplied with game. He goes, also, in advance of the party in the morning, and at noon awaits them with a string of trout. All are Christians, and never eat anything without offering up a blessing, and never rise without praying. Mohen is the name of the Flathead chief. Four old sages came in yesterday, also Adolph and three or four of his men. They were invited into the room this morning about 10 o'clock. I informed them that I had given a license to Mr. Owen to trade with them, as I understood that Mr. Owen and his brother had always acted honestly towards them; that if they had any complaint to make against him, now was the time to make it. I also said that I would leave Mr. Mullan here, who would see to their wants, and also that their rights were not invaded. I told them that their rights were the use of their own lands, and that the Great Father desired them to be at peace with themselves and the whites, and to remain so forever. The Great Father wishes you to raise more wheat and potatoes, and to collect more meat and skins, that you may not suffer from want. He sends to you traders, so that you may not be compelled to go a great distance to procure blankets and such things. We will leave Lieutenant Mullan with ten or fifteen men to protect you from the Blackfeet; but they have promised not to disturb you, and I believe that they mean to abide by it. After telling them that I would see them again next spring, I wished to know if they had any questions to ask. After conferring among themselves, they replied that they had none. In answer to inquiries, they informed us that there were about twenty-five lodges of Nez Percés in the Flathead camp, hunting buffalo, each lodge containing two men.

That they have a good many more women than men, though probably not double as many—not so many as the Blackfeet, but a great many children.

Finissiant then complained about the Blackfeet waging war against them and stealing their horses, but now that I had come he thought that this would continue no longer. I told them that the Blackfeet had spoken of how good they were, receiving them in their camp after they had warred against them. That their young men were the cause of the difficulties, and they were not able to restrain them. Now, however, the Great Father's voice had been heard in the matter, and the Blackfeet had returned to their camp to tell their people so. Finissiant then said that whenever they made peace with the Blackfeet they always commenced war again by killing one of their number, for which they were obliged to take revenge. I then showed them two Piegans, with whom I said I was willing to trust myself anywhere. I said that I believed all their chiefs and principal men were good and honest, and that they will control their young men, if necessary. Finissiant said that when our young men do wrong we talk to them and they mind what we say. I then told them that the Blackfeet desired to meet them, and the Nez Percés, and the Spokanes, and the Snakes, and other neighboring tribes, in council next year at Fort Benton, to make an everlasting peace. That they should all unite to prevent any man killing another or stealing a horse.

Finissiant replied that a word from their chief would prevent any trouble being made by their young men. I then asked them if they would go to Fort Benton next year. Finissiant replied that this will be a fine country after peace is made.

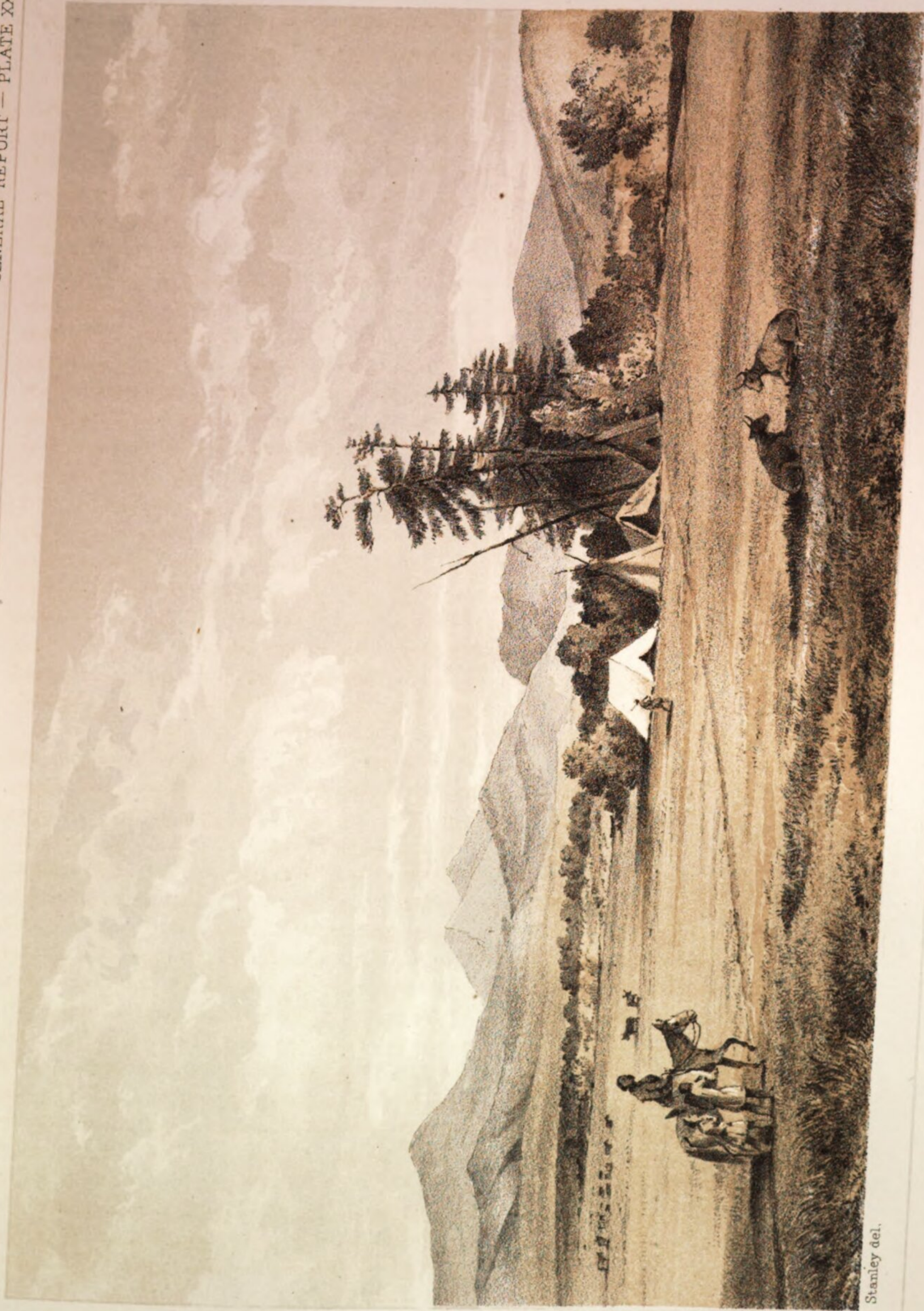
I said that they might not be able to say now whether they would go to Fort Benton, but I desired to hear their opinion about it. The Blackfeet had confessed that they had acted wrong, and I wished all the Indian tribes to hear it and be witnesses. Finissiant said that they had met a party of Blackfeet while hunting, and that they told them that the whites had advised them to make peace, which they would be glad to do. They will all go to the Blackfeet next spring. I then said that I would send word to the Great Father about the peace between the Flatheads and Blackfeet. When I heard from the Great Father I would send word to Lieutenant Mullan, who would inform them when to go to Fort Benton. They replied that they were satisfied. That they sometimes went to Fort Benton to trade, and across the mountains to hunt. Now they could go oftener, as they do not fear the Blackfeet as they did before. I then said that I would send word, by the two Piegans, to the Blackfeet that the Flatheads would meet them next year. This would please the Blackfeet very much. They then asked me to arrange everything for them. I called Mr. Monroe before them and told them that he had lived near the Blackfeet nearly thirty years; that he married a Blackfoot woman of the Piegan tribe; that he would soon return to the Blackfeet and tell them what he had seen. Mr. Monroe then told the two Piegans that the Flatheads promised to meet their people next year to make an everlasting peace; that the Flatheads are full of joy, and that they must tell their people this when they return. Monroe, at my request, gave them an account of Stanley's trip to the Blackfoot camp and the kind treatment which they received from the tribe. I advised the Flatheads to remain until to-morrow, promising to furnish them with provisions and tobacco. The Flatheads inquired what should be done in case the Blackfeet came near their camp at night.

They were advised not to attack them unless it was evident that they intended to do mischief. Still they must not remain quiet, and see their men killed or horses stolen. It would be best

to leave the matter in the hands of Lieutenant Mullan, who would act for them. However, it is not believed that the Blackfeet will come with any such intention.

It may not be necessary here to dwell more particularly upon the arrangements which I made with Lieutenant Mullan, as his contemplated field of duty has been explicitly referred to. But this gentleman had impressed me in the most favorable manner, by the way in which he had discharged his recent duty, with the great confidence which the Indians had formed for him, and I was satisfied that very important results would grow out of his labors. I determined to despatch Lieutenant Donelson in charge of the main party over the general route pursued by Lieutenant Saxton, and to assign Mr. Lander to duty with him, in order, by side examinations, as well as on a direct route, to collect all the data bearing on the question of construction. Accordingly, on the 2d instant, Mr. Lander went down the valley in advance of Lieutenant Donelson, in order to make some examinations of Hell-Gate, and on the 3d Lieutenant Donelson was under way with the main party. I left on the 4th, and overtook and camped with the main party in my old camp of the 27th and 28th of September. Continuing on, on the 5th we both moved down the valley, and encamped on the Bitter Root, some three or four miles below the mouth of Hell-Gate. Here I ascertained that Mr. Lander, instead of waiting for the arrival of Lieutenant Donelson, to receive the instructions which I had directed to be issued to him, to go down the Bitter Root to its mouth, and join the main party at the Horse Plain, had preceded him on the main trail, and must be somewhere between the divide between the Bitter Root and the Jocko. Accordingly, by my instructions, Lieutenant Donelson sent an order directing him to return to his present camp, in order to proceed on the duty which had been assigned to him. This same day I visited Victor at his camp on the Hell-Gate, three miles above its junction with the Bitter Root, and in return was visited by him at our camp, where we had much interesting conversation in regard to the Indians, the character of the country and the passes, particularly in the winter. I determined to remain here until Mr. Tinkham returned, who had not yet been heard from.

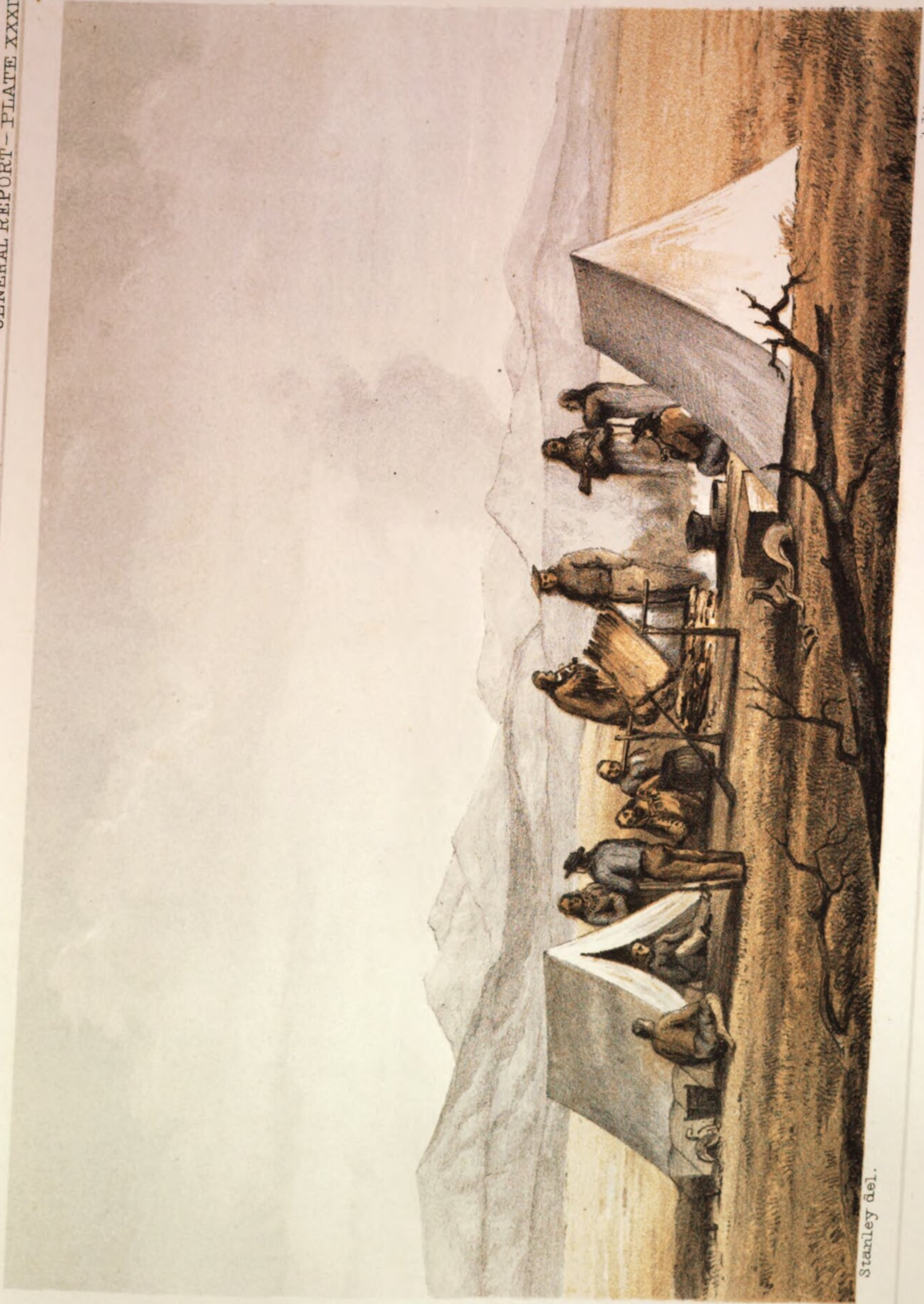
October 6.—Lieutenant Donelson moved off this morning on the route of the Jocko river and Clark's Fork. Mr. Lander, who had returned to my camp in compliance with instructions, moved down the Bitter Root river this afternoon. I sent up to Fort Owen for Mr. Mullan, and we remained in camp, passing the time, as patiently as we could, awaiting the arrival of Mr. Tinkham. Meanwhile a huge joint of beef was placed upon the spit, to be in readiness when the explorers should come in, and honest Sergeant Simpson undertook to act as cook. Bending over the fire, with huge drops of perspiration rolling from his glowing red face, a picture was presented which Mr. Stanley thought not unworthy a trial of his pencil, while Osgood jokingly told Simpson he was working then for "two dollars a day and roast beef." The meat was cooked in the nicest manner, and at five and a half o'clock we sat down to it, having as guests Mr. Tinkham and his party, the returned "lost sheep of the house of Israel," also Lieutenant Mullan, who arrived in season to join us in our meal. Mr. Tinkham gave me an account of the incidents of his trip. As anticipated, in consequence of his proceeding without a guide, he had had difficulty in keeping the proper trail, and finally he found himself in a low valley, closely hemmed in by inaccessible mountains, and covered with a dense growth of wood, through which they were obliged for one day to cut their way with axes, making during the day but six miles. This valley led them to Clark's Fork, and thence they crossed the ridge and came into the Jocko river valley. Arrived here, they became aware of their whereabouts, and, leaving camp early this morning, pursued the trail taken by Lieutenant Donelson's party, which they



Stanley del.

J. Bien N. Y. lith.

VICTOR'S CAMP - HELL GATE, RONDE.



met in the defile near the summit of the dividing ridge. On his route Mr. Tinkham passed the Flathead fort, which is situated on one of the tributaries of Clark's Fork, a little distance to the north of Jocko river. It is at present unoccupied.

I now determined to send Mr. Tinkham across the mountains again, to explore the Marias Pass, on which my mind has been so long fixed as a practicable and direct pass, and to return to the Bitter Root valley by some route south of those already explored; thence by the southern Nez Percés trail, to examine another route over the Bitter Root to Walla-Walla. The animals wintering at Fort Owen and at Fort Benton would suffice to afford him an exchange; and as I was satisfied that in the course of this trip his conferences with Mr. Doty and Mr. Mullan would all lead to a better mutual knowledge of the country, accordingly I made the necessary arrangements at once, and sent an express to Mr. Donelson informing him of the fact, and directing him to make the necessary pauses on his route that Mr. Tinkham might overtake him, and to furnish him with provisions and some fresh animals; and I availed myself of the opportunity to advise Mr. Doty, by letter, of the arrangements, and to suggest to him that it might be well for him to return with Mr. Tinkham to the Bitter Root valley, in order to enlarge his own knowledge of the country, and conceive properly the deportment of the mountain region, so that, returning immediately, he would have an enlarged and just view of his field of duty. This, however, I left optional with Mr. Doty, whose plans and labors, acting under my general instructions, I could not altogether foresee.

It is extraordinary how easy of passage the mountains are in this latitude. A favorite time of the return of the Flathead Indians from the buffalo hunt is between Christmas and New-years; it is only in winters of unusual severity that they are unable to cross during any month. The Indians west of the Cœur d'Aléne mountains return from the hunt usually in March, leaving the buffalo grounds early in March, and reaching their homes at its close. I dwelt upon this in conversation with Mr. Tinkham, and wished him to let it be thoroughly understood by Mr. Doty, that the latter may not fear being caught in the mountains or obliged to winter at St. Mary's.

We have to-day seen a good deal of Victor in our camp, the Flathead chief, celebrated in the book of De Smet. He appears to be simple-minded, but rather wanting in energy, which might, however, be developed in an emergency. I secured a Flathead guide to go with Mr. Tinkham through the Marias Pass, returning with him by the Flathead Pass. He was at first reluctant to go, but afterwards consented. In the course of the evening the Flathead Indian came to me to decline going, and one or two of the men wished to back out. On tracing the cause to its source I found they had been alarmed by some remarks of Monroe, who told them he was afraid they would fall in with parties of Blackfeet young men.

I will here remark that the Indian agent, Lansdale, in 1856, went over the route from the Jocko to the Big Blackfoot, sought for by Mr. Tinkham in 1853. It is much used by the Upper Pend d'Oreille Indians in going to hunt buffalo east of the mountains. The following description will show the character of this route:

Leaving the Mission of St. Ignatius the trail leads up the main fork of the Jocko, which runs through an open grassy bottom interspersed with pine trees. After following this stream for six miles the trail passes up the east fork, which has an open valley for about a mile, when the country becomes thick with trees, and many fallen logs obstruct the passage; the hills rise high on either hand. In about ten miles the valley becomes narrow and the path rough and difficult, going in many places along steep rocky hill-sides. In about five miles further are a

chain of lakes which extend to the headwaters of Little Water river, a tributary of the Big Blackfoot. The trail keeps along the margin of these lakes, sometimes in water; in high water it cannot be used. Upon reaching the divide the country is more level, the mountains recede towards the east, and small streams come in from both sides, but principally from the east, and soon form quite a stream. The country is wooded with pine, and much fallen timber occurs. Some low, swampy places occur on the first lake of Little Water river, and at ten miles from the divide the trail crosses a large stream, not passable at high water, which is supposed to be the principal fork of Little Water river. After crossing this stream the trail crosses a low divide, along two or three little lakes with no outlet, and so on to open pine woods and prairies to some creeks running in a westerly course to the Blackfoot fork, before reaching which the country opens into a large prairie; crossing a large stream coming in from the east, the trail passes on direct to the Blackfoot fork.

This route has plenty of wood, water, and grass, but is only fit to be passed over in dry weather; is impassable for wagons, and could only be made so by a great outlay of labor; in wet weather or spring time it would be impassable.

BITTER ROOT RIVER TO FORT WALLA-WALLA.

October 7.—This morning the instructions to Lieutenant Mullan and Mr. Tinkham were reduced to writing; and by Mr. Mullan I sent word to Dr. Suckley, enjoining particular caution in his arrangements for descending the Bitter Root river. At 8½ o'clock we were on the road, the party consisting of Mr. Stanley, the artist, Mr. Osgood, my disbursing agent, and four voyageurs, with Antoine Plante, the half-breed guide. Mr. Lander, who had preceded us, we overtook in twenty-seven miles; when, after a short pause, continuing on eight miles over a rolling, and, in a few slight points, difficult country, we came to a good camp on a small stream of water; wood and grass most excellent. The first twenty-seven miles of the march to-day was through a fine prairie, wooded during the latter portion of the route. Our guide informs us that we shall to-morrow meet Indians going to buffalo. I forbear giving the incidents of this day's route with very great detail, as they will appear in the journal of my trip of 1855. I will simply observe that the valley of the Bitter Root is generally a wide valley, with occasional spurs running sharp down to the banks of the stream, but having opposite to such spurs an open and practicable prairie on the other side of the river. On both sides many streams of clear and pure water are seen, and the country is extremely well wooded and well watered generally.

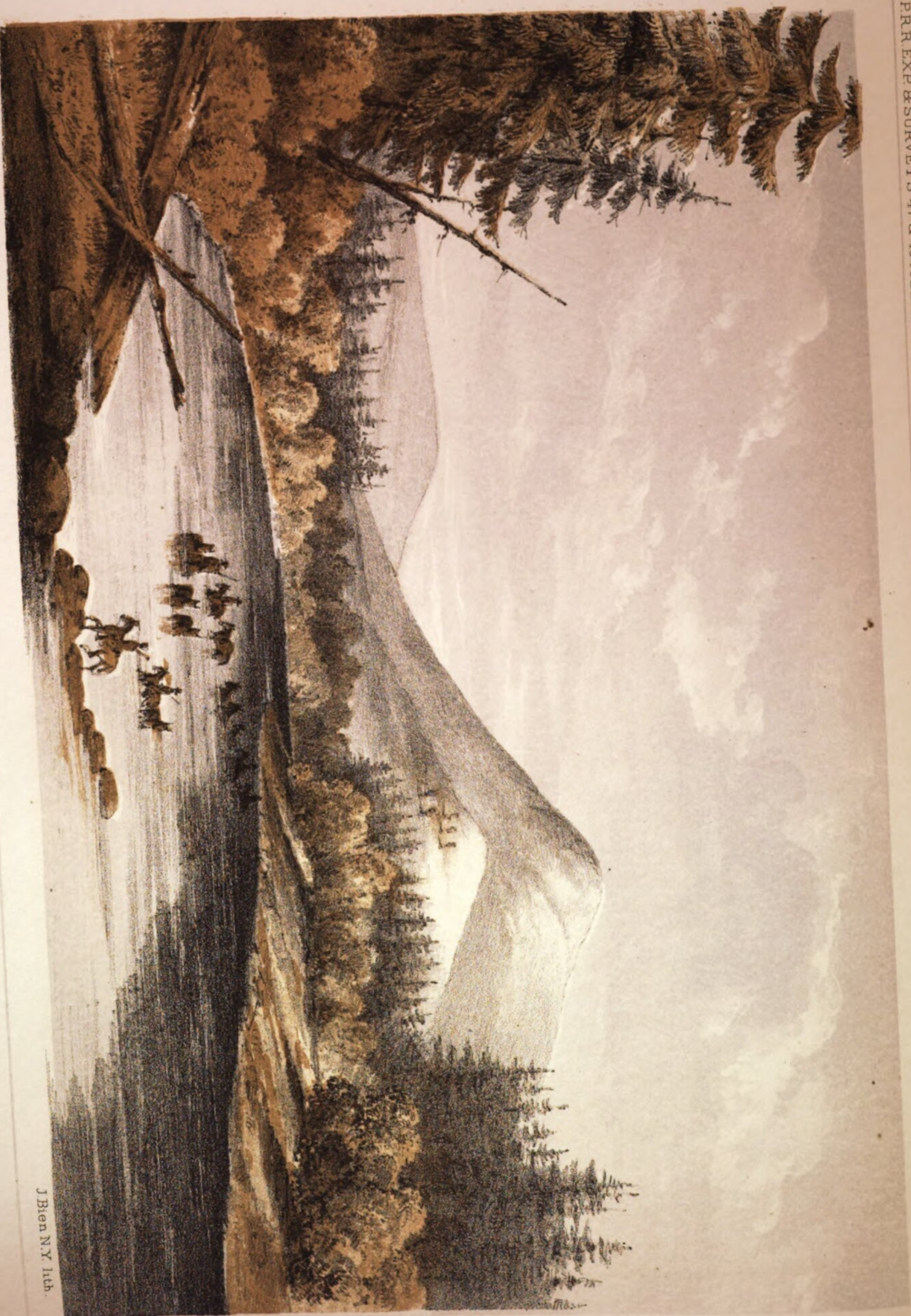
October 8.—We started at 7½ o'clock, passing over a hilly, wooded, and at times difficult country, with several patches of prairie, one of which, two and a half miles long and containing, probably, 1,000 acres, was covered with an excellent growth of grass, and at its western border was wooded. Here we met a band of about fifty Nez Percés Indians going to hunt. They have from 250 to 300 horses, most of them splendid animals, in fine condition, and with perfectly sound backs. Women and children helped to compose the band, and babies of fifteen months old, packed in a sitting posture, rode along without fear, grasping the reins with their tiny hands. We met them in the entrance to a narrow place, a mile in length, leading along the water's edge; and wishing to have a talk with them, but unwilling to lose the time in returning to the open ground, I invited them to turn around to the first prairie, which Antoine assured me was not more than a mile or two beyond. The prairie we found to be well grassed, open and wooded. We now made our halt, and while preparing for the talk with the Indians a band of



Stanley del.

J. Bien N.Y. lit.

NEZ PERCES.



Stanley del.

J. Bien N.Y. lith.

CROSSING THE BITTER ROOT

Cœur d'Alénes joined us. They, too, were on their way to the hunt, and numbered about sixty, men, women and children, and had 200 horses and colts. We had a long talk. I told them about the steps taken to meet in council at Fort Benton; dwelt particularly upon the prospect of the Blackfeet making peace with all the Indian tribes; upon the promise they had given that their war parties should be stopped; and told them that at Fort Benton and St. Mary's I had left men who would interfere, unless these war parties were to cease. This intelligence was most gratefully received. They tell me that they return from the hunt in March, going home by the Pend d'Oreille route. We parted with them at two o'clock, and at six made a good camp near the ford by which we mean to cross to the left bank of the St. Mary's river, upon whose northern bank we have been travelling. The road has been better this afternoon, not as hilly and more open. Two miles from camp we met two Pend d'Oreilles, who turned around with us. At the camp we found a mother and daughter, who had just crossed the river and pitched their lodge. They had eight pack and as many spare animals, and were on their way to join the Indians we met this morning. We gave all the Indians coffee, and the women in return gave us some cooked camas root. It is of a dark color, small, between the pear and onion in shape, and of a sweet, agreeable flavor. The Pend d'Oreilles say that they have found four horses left by Saxton upon Horse Plain, and promise to return them to Lieutenant Mullan. One of the Indians, an old man, knows the St. Mary's river well, but is not able to act as guide to Dr. Suckley. He thinks, however, the father of one of his companions, also a good guide, will go; and he promises to get him and take him to the doctor. I wrote by them to Mullan and Suckley. During the night one of my best riding horses was strangled, his lariat being improperly tied around his neck.

October 9.—We started at 8 a. m., and crossed the ford. The ride of to-day has been rather tedious than otherwise. We left the valley to get rid of the undergrowth of bushes, and took a trail over the side-hill, which carried us up and down hill successively, and in some instances through woods, occasionally obstructed by fallen timber. At noon we halted at a creek, where we found a single Indian family drying venison. For a little tobacco they gave us some fresh meat and a trout, which we roasted before the fire, and which made us a substantial lunch; after which, pursuing our course, we fell upon a stream flowing from the dividing ridge, and continuing up it some six miles, made a camp, where we found an abundance of grass. Distance to-day nineteen miles.

October 10.—We continued in the valley about ten miles, the road leading through wood. Larch and spruce and inexhaustible supplies of limestone and marble were met with, and the latter we afterwards found in good quantities all through the mountains. At this point the trail forks, one keeping to the right along the stream, and the other turning to the left and passing over a high overhanging mountain spur. Our guide, Antoine, informed us that the mountain trail was more easy for the animals, the one to the right being much obstructed by fallen timber. After commencing the descent we heard the voices of our men driving the animals in the valley beneath us, and waited till we turned them upon the trail we had concluded to take. We ascended the dividing ridge and reached a camp upon a small lake, within a mile of its top, with good grass. The lake, to which we were obliged to descend for water, is twelve hundred feet below the camp.

October 11.—The pass beneath us was made by two rivers flowing from the dividing ridge in opposite directions; have their sources in lakes not more than half a mile apart; the general direction of the valley being east and west. We estimated our camp to be two thousand feet

above the eastern base of the mountain, and two thousand five hundred feet above the western base. The lake upon the eastern side was about twelve hundred feet below us, and that upon the western side about seven hundred feet higher. After pitching camp last evening a drizzling rain commenced falling, which we supposed would turn into snow before morning. Upon awakening this morning we were surprised to be greeted with one of the loveliest days imaginable. The sky was clear, and the air as soft and balmy as a morn in summer. After striking camp we ascended to the highest point of the ridge, about one mile and a half from camp. Here we made a long halt, enjoying the magnificent view spread open to us, which, I venture to say, can scarcely be surpassed in any country. Far distant in the east the peaks of the Rocky mountains loom up into view, stretched out to a great length, while the Flathead lake and the valley thence to the Blackfoot Pass was plainly visible. Nearly the entire range of the Cœur d'Aléne mountains, clothed with evergreen forests, with here and there an open summit covered with grass; numerous valleys intersecting the country for miles around; courses of many streams, marked by the ascending fog, all conduced to render the view fascinating in the greatest degree to the beholder. The mountains were covered with luxuriant coarse grass. Seated on this point, Mr. Stanley was enabled to transfer this beautiful panorama to his sketch book. Descending the peak to the general level of the ridge, we continued on for nearly six miles, when the descent commenced, and in less than three miles we passed down a very steep descent and gained the base of the mountains, which we estimated rose three thousand five hundred feet above it. This brought us into a valley filled with gigantic cedars. The larch, spruce, and vine maple are found in to-day's march in large quantities, the latter giving a pleasing variety to the forest growth. About 4 o'clock we encamped upon the bank of the stream, which here grows much wider. We find the grass scanty, and therefore intend making an early start and breakfast seven miles on the road. A Cœur d'Aléne accompanied us to this point from the eastern base of the dividing ridge, and at night's encampment we find a Cœur d'Aléne and his wife on their way to hunt.

October 12.—The scarcity of grass last night caused our animals to wander, and three of them were found at the base of the mountains six miles back. It was not until 10 $\frac{3}{4}$ o'clock that our men had them all collected, and we were prepared to move. We rode until half-past three, when we halted at a beautiful camp, although the day's march had been but twelve miles. Learning from Antoine that the Cœur d'Aléne Mission was only eleven miles beyond, I determined on going in to-night. Antoine and I accordingly mounted and rode to the Mission in an hour and three quarters.

The Mission is beautifully located upon a hill overlooking extensive prairies stretching to the east and west toward the Cœur d'Aléne mountains and the Columbia river. About a hundred acres of the Eastern prairie adjoining the Mission are inclosed and under cultivation, furnishing employment to thirty or forty Indians—men, women, and children. I observed two ploughing, which they executed skillfully; others were sowing wheat, and others digging potatoes. Pere Sazzoli received me with the most pleasing hospitality. Associated with him are Pere Avali, now absent to procure supplies, and Charles Huet, and Maginn. The latter, however, is a layman, attached to the Pend d'Oreille Mission, who is here at this time to assist in harvesting. Towards evening I witnessed the burial of an Indian chief. The funeral ceremonies were conducted after the Catholic form, and I was struck with the harmonious voices of the Indian choristers, and with their solemn observance of the ceremonies.

The Mission is composed of buildings inclosing a square. Some of them are quite old, but



COEUR D'ALENE MISSION, ST. IGNATIUS RIVER.

the barn is large and new. The church stands a little distance from the rest, and does much credit to those who erected it. It is constructed upon a plan designed by Père Avala, and is of the Roman demi style of architecture. Pulleys and ropes were the only mechanical aids in the construction. Père Avala is quite an architect, and drew up many designs before the one adopted was selected. In his room, which I was kindly given to occupy, was his library. I observed that it contained several standard works on architecture. The church was not completed, although sufficiently so for the performance of service within. The interior is prettily arranged. The altar is supported by two massive timbers of pine which are about four feet in diameter. We were informed that in erecting these pillars an Indian who was holding one of them became frightened and let it fall, fortunately without injury to any one. The priests live in a self-denying manner, and the good effects of their influence over the Indians around them are plainly manifest.

There is quite a village of Indians near the Mission. They have some half dozen log-houses, but most of them live in lodges.

October 13.—While awaiting the arrival of the train, I was enabled more particularly to observe the manner in which the affairs of the Mission were conducted. Brother Charles has charge of the buildings and attends to the indoor work, cooks, makes butter and cheese, issues provisions, and pays the Indians for their work, which payment is made in tickets bearing a certain value, "good for so many potatoes or so much wheat," &c. By this management the Indians are able to procure their subsistence in the summer by hunting and fishing, and have tickets in store for living during the winter. They are well contented, and I was pleased to observe habits of industry growing upon them. In the barn we saw their operations of threshing: four boys rode as many mules abreast around in a circle, being followed by two girls with flails, who appeared to be perfectly at home in their business. One-half of the barn is reserved for their crops, while the other is arranged for cattle. Their stock at present consists of twenty cows, eight pairs of oxen, and ninety pigs, which are driven to pasture upon the prairie by Indian boys daily. I noticed an Indian woman milking, and was surprised to see her use both hands, something rarely seen amongst the Indians. We afterwards visited the field—a large fire was burning and around it sat Indians roasting and eating potatoes. There appeared to be a great scarcity of proper implements, and in digging potatoes I noticed that many had nothing better than sharpened sticks.

The train arrived about one o'clock, and Père Sazzoli allowed us to turn our animals into the inclosure.

I will remark that Brother Magin declares himself to be, like many other naturalized citizens, a good democrat; inquired who was President, and appeared much pleased to learn that he was a democrat.

Mr. Stanley took a sketch of the Mission.

I have heard of an ingenious method of hunting deer, which is practiced by the Indians and is worth while to relate. When the Cœur d'Alénes, Pend d'Oreilles, Spokanes, and Nez Percés meet together to fish and hunt, they form a large circle, and upon the trees around its circumference attach pieces of cloth made to resemble the human figure as much as possible. Then the hunters enter the area and start up the deer. Each cloth having the effect of a man, the deer afraid to pass them are kept within the circle and easily killed. Last year the Pend d'Oreilles killed 800 in one hunt; the Cœur d'Alénes more than 400. It is said that the

Cœur d'Alénes on the St. Joseph river have finer lands and larger prairies than those of this Mission.

October 14.—A Nez Percés, "Frank," who, with two men, arrived yesterday from Walla-Walla in three days, (probably three nights,) and who stopped here to exchange horses for flour, says that fifty wagons have crossed the military road from Walla-Walla to Nisqually. The distance for pack animals from here to Walla-Walla is six days, to Colville four days, and four days to the Pend d'Oreilles Mission. For the provisions we have purchased of the père he takes whatever we chose to give. I leave with him a letter to Mullan to be forwarded, with the request that he will accompany it by one from himself. When the Indians returned from the field I addressed them as follows:

"I am glad to see you and find that you are under such good direction. I have come four times as far as you go to hunt buffalo, and have come with directions from the Great Father to see you, to talk to you, and to do all I can for your welfare. I see cultivated fields, a church, houses, cattle, and the fruits of the earth, the work of your own hands. The Great Father will be delighted to hear this and will certainly assist you. Go on, and every family will have a house and a patch of ground, and every one will be well clothed. I have had talks with the Blackfeet, who promise to make peace with all the Indian tribes. Listen to the good father and to the good brothers who labor for your good." In the evening I had a long conversation with the père and the brothers.

October 15.—We started at 8 o'clock, after having given Brother Charles as many lariats for raising the timbers of the church as we could spare, and made $18\frac{1}{4}$ miles, meeting on the way some forty Indians, Cœur d'Alénes, Nez Percés, and Spokanes, on their way to buffalo. We camped to-day in a beautiful prairie, called the Wolf's Lodge, with good grass. Here we found nearly 100 Spokanes, with some 300 horses, on their way to the hunt. Among them there were only three Nez Percés. We gave them a little tobacco and some fresh pork. Towards sundown this evening I was greatly interested in observing our friends, the Spokanes, at their devotions. A bell rang, and the whole band gathered in and around a large lodge for evening prayers. There was something solemn and pathetic in the evening psalm resounding through the forests around us. This shows what good results can flow from the labor of devoted missionaries; for the Spokanes had had no religious instruction for the last five years. As I went down the river and met band after band of the Spokanes, I invariably found the same regard for religious services.

Afterwards they came around my camp fire and we held a talk. They tell me that six days since Governor Ogden and three gentlemen, with some soldiers, left Walla-Walla for Colville, to meet me. Gary, they say, is at his farm four miles from the Spokane House. I spoke to them also in reference to their being on friendly terms with the Cœur d'Alénes.

The country through which we have passed to-day, though obstructed with fallen timber and rolling, and at times broken in surface, was arable, and reminded me of a great deal of country that I have seen in New England, where now are productive farms; and it was so with the wooded portion of the journey of October 16, lying between our camp and the Cœur d'Aléne prairie. The country intermediate between this and Clark's Fork on the Pend d'Oreille lake, was described to me by the fathers and brothers at the Cœur d'Oreille Mission we had just left, as also arable, well watered, and not much intersected by spurs or ridges.

October 16.—We started at 8 o'clock, our route being through an open wooded prairie. Soon after leaving camp the Cœur d'Aléne lake came in view to the south of us, and eleven miles

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Stanley del.

J. Bien N.Y. lith.

FALLS OF THE SPOKANE.

from camp we struck it near its western extremity. It is a beautiful sheet of water, surrounded by picturesque hills mostly covered with wood. Its shape is irregular, unlike that given it upon the maps. Its waters are received from the Cœur d'Aléne river, which runs through it. Below the lake the river is not easily navigable, there being many rapids, and in numerous instances it widens greatly and runs sluggishly through a shallow channel. Above the lake, I am informed by the missionaries that it is navigable nearly to the Mission. Upon the eastern side appears a range of hills, along the eastern base of which I think the road from the Mission to Walla-Walla passes. Leaving the lake, we followed the river on its northern bank, passing a camp of Cœur d'Alénes, occupied with their trout fisheries. Here we witnessed a touching sight, a daughter administering to her dying father. Still keeping through open woods in a most excellent road, in two miles further we came to the Cœur d'Aléne prairie, a beautiful tract of land containing several hundred square miles. Trap rock, projecting above the surface of the ground, borders the river as we enter the prairie. Continuing on, we met a half breed, Francis Finlay, on his way to the Bitter Root valley with his family, among whom we saw his pretty half-breed daughter. He lives near Colville, just beyond the ferry. They were well dressed and had a very respectable appearance. After crossing the prairie a distance of some eighteen miles, we continued on and encamped at a spring with sparse grass. Had we gone two miles further we should have found an excellent camp on the river, and the next morning some of our animals were found in this very spot. Three miles before reaching camp we struck Saxton's trail, edge of the prairie, and near by we met some Spokanes, who said Garry was at his farm and that he had caught some of the horses left by Saxton. The horses of the Spokanes roam over this prairie in herds of from 12 to 20. Towards the latter portion of the march the river runs over a rocky bed of trap.

October 17.—Leaving camp, Antoine, Osgood, Stanley and myself turned from the trail to visit the falls of the Cœur d'Aléne river, while Lavatte took the train ahead in the trail to the Spokane House. There are two principal falls, one of 20 feet and the other of from 10 to 12 feet; in the latter, there being a perpendicular fall of 7 or 8 feet; for a quarter of a mile the descent is rapid over a rough bed of rocks, and in this distance we estimate a fall of 90 or 100 feet. One mile below this point we came to the ferry crossed by Saxton. Here there is a small Indian village, and the inhabitants were engaged in catching salmon. I noticed one large woman, who seemed to pride herself upon her person, which she took pains to set off in the most becoming manner, by means of a blanket wrapped around her. The road to the Spokane House was over a sandy prairie interspersed with groves of pine. Crossing a dividing ridge with high and steep banks we came into the prairie in which the Spokane House is situated, in which were two Spokane villages. We inquired for Garry and I sent him a request that he would visit me at my camp. The train we found a mile below the junction, across the Spokane. The Indians indicating a good camp some distance beyond, we moved on, $8\frac{1}{2}$ miles, to it, which we reached half an hour before sundown. Here there was good grass and plenty of water, and we soon made up a large camp fire. After arranging matters in camp, I observed about night fall a fire down the river, and strolling down to the place came upon a little camp of Spokane Indians, and found them engaged in religious services, which I was glad of the opportunity to witness. There were three or four men, the same number of women, and half a dozen children. Their exercises were 1, address; 2, Lord's Prayer; 3, Psalms; 4, Benediction, and were conducted with great solemnity. In the evening Garry visited us with some of the tribe. They gave rumors of a large party having arrived opposite Colville, also of a small party having gone

from Walla-Walla to Colville. In the latter party was Jack Macfeely's guide, and I learned with certainty that he had passed here two or three days before with two men, and that he reported that Macfeely's party had had a hard time and lost several animals. There is also a report of the arrival of a party at Walla-Walla from the mountains. I am also informed that an old man has just come from the Yakima valley in four days, bringing news of a party operating in that vicinity, towards Colville. I cannot learn whether the party is under charge of Captain McClellan or one of his officers. The Indians confirm the intelligence given by the Cayuse Indians at the Cœur d'Aléne Mission, that 30 wagons have crossed the Cascades by the millitary road, but rumors vary as to their success in getting through.

Garry was educated by the Hudson Bay Company at Red river, where he lived four years, with six other Indians from this vicinity, all of whom are now dead. He speaks English and French well, and we have had a long conversation this evening; but he is not frank and I do not understand him. He has a large field, where he raises a large quantity of wheat. Tomorrow he is going to Colville to get some of it ground. He remained in my camp more than two hours, finally leaving with a young man who promises to carry a letter to Donelson, informing him that there is a good trail from the Spokane House to the Yakima country, but saying that I could learn nothing definite of McClellan. Garry promises to send me to-morrow the Indian who has just arrived from the Yakima country, and who is posted up concerning the news at that place.

October 18.—A Spokane breakfasted with us this morning and we started at 8½ o'clock. After riding until ten o'clock we were joined by the old Indian referred to yesterday, and Antoine's services were immediately put into requisition to obtain information. At 12½ o'clock we lunched. The old man stated that a large party reached the bank of the river opposite Colville yesterday, and that they would cross to-day. I was satisfied from his accounts that the party was McClellan's, and accordingly determined on going to Colville to-night. Antoine has horses half way. We rested until 2 o'clock and then set out, Antoine and myself pushing ahead of the train. We met Antoine's family encamped in a fine prairie, with whom Antoine remained, sending his brother-in-law on with us as a guide. At 4¼ we reached the ferry, where we were detained fifteen minutes. At 4¾ we meet Jack, who informed me that Macfeely reached Walla-Walla three weeks ago, being 22 days coming from St. Mary's. He lost twenty animals, and was detained two days in an unsuccessful search for a man who had strayed from the trail. The road was bad, they got off the trail, having struck too high up. Jack told us that it was 28 miles to Colville, and that we could not reach there to-night, but being determined to do so we pushed on and reached Brown's at 5¾, who informed us that the distance to Colville was 18 miles. After partaking of some bread and milk, we resumed the road with the same animals, dashing off at full speed, going 8 or 9 miles an hour most of the way, and reached Colville at 9 o'clock. Mr. McDonald, the trader in charge gave me a most hospitable reception, and addressed a note to McClellan, who had just gone to his camp near by, informing him of my arrival. McClellan came up immediately, and though I was fairly worn out with the severeness of the ride, we sat up till one o'clock. At 11 we sat down to a nice supper prepared by Mrs. McDonald, and we regaled with steaks cooked in buffalo fat, giving them the flavor of buffalo meat. I retired exhausted with the fatigues of the day.

October 19.—This morning I met Captain McClellan and the gentlemen of his party, and possessed myself of the main facts of the explorations made by them of the Cascades. The

map had been well kept up by Mr. Duncan, the topographer; and all the gentlemen had seemed to co-operate most zealously with Captain McClellan in the discharge of their duties.

Captain McClellan reached Vancouver on the 27th of June; finding much difficulty in procuring the proper pack animals, and other necessary outfit, did not get his party in motion until July 18. The necessity of having Lieutenant Saxton's train off as soon as practicable, and the preparation of his party, delayed him, besides thus exhausting the supply of serviceable animals; and Indian horses, many of them of poor quality, had to be substituted for the mules, which, for service in such a country, should be of the best kind only.

The party, as organized finally, consisted of Captain McClellan, Lieutenant Duncan, 3d artillery, as astronomer, topographer, and draughtsman; Lieutenant Hodges, 4th infantry, quartermaster and commissary; Lieutenant S. Mowry, 3d artillery, meteorologist; Mr. Gibbs, geologist and ethnologist; Mr. J. F. Minter, assistant engineer; Dr. Cooper, surgeon and naturalist; Mr. Lewes, interpreter; five assistants carrying instruments, &c.; two sergeants, two corporals, and twenty-four privates as escort and workmen; twenty-two packers and three hunters and herders made the whole number sixty-six.

Guides were engaged among the Indians as they passed from one tribe to another, few knowing more than a very small area of country around them. The animals obtained were one hundred and seventy-three in number, of which only forty-six were mules, and one hundred of all were used for packing. The pack-saddles brought from San Francisco proved worthless, as well as those brought from the Hudson Bay Company; and about fifty old-pattern dragoon saddles, which happened to be at Vancouver, fortunately filled their place admirably, as far as they went. The almost unknown character of the country to be traversed, and the uncertain disposition of the Indians, made it advisable to take a larger party than was afterwards found necessary.

The country east of the Cascade range being more open and traversable than that on the western slopes it was considered best to reach there early and conduct the examination of the mountains by striking in with small parties whenever a practicable pass was met with. The unusually high stage of water in the Columbia made the usual trail eastward, on its banks, impracticable, and that of the Klikatat Pass, near Mounts St. Helen and Adams, was adopted.

This trail being but little used, and much obstructed by brush and fallen timber which required cutting, the party made slow progress at first, and reached the summit of the mountains on the 5th August, having made only seventy-eight and three-quarter miles in twelve days' travelling. The route up the western slope was through a densely timbered country, some small prairies occurring at intervals in the valley of the Cathlapoot'l and its branches. These became fewer, and grass was scarce, as the train progressed, so that the animals suffered severely, while, from the flooded state of the valleys, or the ignorance of the guides, he was led over some very rough mountain spurs, among which one of the best mules got killed by rolling down a precipice. On the mountain summit excellent pasture was found, though timber of immense size still covered all but the highest peaks, up to an elevation of 4,500 feet more.

Three days' halt was made there to refresh the animals and to examine the country. As there seemed to be no practicable road pass in this portion of the mountains, Captain McClellan resolved to pass along their eastern slopes northward to Mount Rainier, where better passes were said to exist.

The first pass explored across the Cascade range was, therefore, the "Klikatat." This ascends the west side by the valley of the Cathlapoot'l, which has numerous beautiful

prairies on its lower portion, and presents no difficulty for twenty miles upward. But, on account of the uncommonly late continuance of the summer flood, Captain McClellan was obliged to take a different course to reach it, crossing several very rough and densely wooded spurs northeast of Vancouver, among which there are numerous small but rich and beautiful prairies, and good soil almost everywhere, even in the gigantic forest by which they are surrounded.

The Cathlapoot'l was struck about twenty-five miles from its mouth, where it runs between rugged broken hills, leaving sufficient valley for a wagon road for ten miles further, when spurs coming in on each side to the river bank compel several crossings on the remaining fifteen miles; when leaving the valley the trail led up a very steep mountain side to a rolling table land at its summit.

Except this steep ascent, which might, doubtless, be avoided by a different location of the route, there is no great obstacle to the construction of a wagon road up to this elevated region, where there is a great extent of beautiful and rich pasture land, and where even cultivation of some products might be successfully carried on.

Its general elevation is from 3,000 to 5,000 feet above the sea, and its delightful climate, in the middle of summer, alone offers much inducement for further exploration.

Besides the Cathlapoot'l, flowing west, there are the "Washookat," "Wind," "White Salmon," and "Klikatat" rivers running from it towards the south, and emptying into the Columbia, fifteen or twenty miles from the line crossed over by the western division. These all offer avenues of approach, and probably have much fertile land in their course. No cold weather was experienced until at the highest camp, "Cheguos," already alluded to, where, on the night of August 8, ice formed to the thickness of about an eighth of an inch. Though, as usual in mountainous countries, the nights were cool, the heat, even on this elevated region, became great by day. On August 11 he commenced the descent of the eastern slopes, and at once found the forests more open and traversable, consisting of yellow pine, with little undergrowth, and generally a grassy sward beneath. After five days' journey through this he entered the open central plains, then very dry and barren in appearance, the tops of the ridges near the mountains being rocky and almost destitute of vegetation. The small valleys on branches of the Yakima showed, however, by the height of the grass, although as brown and dead as in winter, that they were capable of cultivation earlier in the year. Near the Atahuane Mission the priests and Indians raise very fine potatoes, besides melons and squashes.

On the Wenass he made a depot camp for two weeks, while parties were made up to explore the surrounding country. Deeming it necessary to have three months' provisions before starting to explore the unknown country northward, Lieutenant Hodges was sent across the "Na-chess" Pass to Fort Steilacoom on August 22, with fifty pack-horses, six soldiers, seventeen packers, Mr. Lewes, and two men; the three latter to be left there. Many of the pack-horses having already given out, he was directed to exchange as many as possible for mules, and also to make a reconnaissance of the route.

On the 29th Captain McClellan himself, Mr. Minter, and six men started to make a survey of the Nachess Pass; the 24th, Lieutenant Duncan went with three men to explore the upper part of the Yakima, and on the 25th Mr. Gibbs, with two men, went to examine it down to its mouth.

The Indians met with hitherto had been peaceably disposed, although they had received

false reports of the character of his party, and sent delegates to meet him on several occasions and to inquire his objects. Large numbers of the mountain tribe of Klikatats were met with on the highest part of the route, engaged in their summer business of gathering berries. On descending to the plains many Yakimas were seen, whose chief, Kamiakan, held a council with Captain McClellan, and expressed the most friendly feelings, besides showing proofs of the sincerity of his professions by giving assistance. The favorable influence of the Catholic priests was here of great benefit to his party, and probably prevented trouble.

Captain McClellan returned from his examination of the Nachess Pass on the 29th of August, and describes the route as follows :

Going up the Nachess river, which is a large branch of the Yakima, at the distance of twelve miles from its junction with the Yakima, the character of its valley undergoes an entire change. The hills by this time became mountains, close in upon the streams, so that the valley from here to the head is reduced to a mere cañon, occasionally widening out for short distances. The stream winds with very sharp curves ; the cañons are often for a mile or two in length, occupied to their whole width by the stream. The walls of these cañons frequently rise vertically to the height of 400 feet, the mountains coming boldly down to their edges, the wall of solid rock, generally trap or a compact igneous rock. The Indian trail is a very bad one, avoiding the valley and keeping to the mountain sides, where the ground is very strong, the ascent and descent long and steep, so much as that it would not be possible to construct a wagon road along the mountain sides at any reasonable expense.

The road would, therefore, be forced into the valley, and necessarily be located at times in the water, besides requiring an almost endless number of crossings.

The timber (yellow pine) commences in the valley, about eighteen miles from its mouth ; for some distance it is open, and with the undergrowth only thick in places. The nearer the divide is approached the thicker the growth becomes, the underbrush and logs more troublesome, and the yellow pine gradually gives place to the white spruce, balsam, fir, &c., until near the sumit it disappears. In all the openings of the valley the grass is good, and some fifteen miles east of the summit there is a chain of small marshy prairies, with excellent grass, while upon the mountains immediately south of the pass are some five or six prairies of larger size and similar nature, through which the trail passes.

The largest fork of the stream joins that up which the trail passes, about twenty-five miles from the summit, and heads directly in Mount Rainier—its valleys is more difficult than that of the trail.

The elevation of the lowest point of the divide is 4,890 feet above Vancouver, and the ascent in the last seven miles of the valley is 229 feet per mile.

Proceeding westward the trail soon descends, by a very precipitous route, into the valley of Green river, follows that as far as its junction with the White river, together forming the Skannish, and keeps to the Skannish almost ten miles further. To the point where the trail leaves this valley the country passed over is all of the same nature. The descent for the first twenty miles is very abrupt, the valley very narrow, much like that of the Nachess, except that it is much more heavily timbered, the mountains approaching the stream so often that frequent crossings are necessary.

Portions of the Skannish valley are very boggy; grass is almost entirely wanting for a distance of at least fifty miles from the summit. From the Skannish to the Puyallup the country is a high plateau, much broken up by ridges and mountains. It is densely timbered

with fir, but interspersed with prairies, the soil of some of which is good. It then enters upon the nearly level plateau bordering the sound.

On the 31st he received a note from Lieutenant Hodges, stating that in five days he had reached within twenty-five miles of Steilacoom, but that grass was very scarce, and his horses having been for three days in the dense forest without any, sixteen of them had given out; he had also learned that no mules were to be obtained, and that it would be impossible to obtain transportation for the provisions required. Captain McClellan at once determined to reduce the party to the minimum by sending in the escort and others, also directing Lieutenant Hodges to discharge some of his men. Lieutenant Mowry was, therefore, sent to the Dalles, with fifteen men to be discharged, then to return with two only, taking, also, everything that could be dispensed with. Lieutenant Duncan returned on the 31st from the Upper Yakima, having explored it to its source in the mountain lakes, and on the same day Mr. Gibbs returned from the mouth of the river. The observations made by them are embraced in the general description of those tracts derived from subsequent explorations. The safe journeys of these small parties showed that, fortunately, a reduction of the force could be made without danger.

On the third September the main camp was moved to the Yakima valley, where another depot was made, while Captain McClellan, with Messrs. Gibbs, Minter, and six men went to examine the passes at the head of the river, and Lieutenant Duncan left in charge to examine as much as possible of the neighboring country.

Here the first traces of gold were discovered, and though not sufficiently abundant to pay for working, it caused considerable excitement in the camp. A large band of Indians, under Ouhi, a brother of Kamiakan, encamped near, and were very friendly, their chief being the most good natured Indian yet seen in the country.

Excessively hot weather had prevailed all the way from Vancouver, except on the mountain summits, adding much to the hardships both of the men and animals, though at night the change was so great as to make the cold feel unpleasant. During the last week of August the heat at noon averaged ninety degrees, and rose once to one hundred degrees.

A week was spent in examining the mountains about the headwaters of this river, with the following results: The pass at the head of the main Yakima, some twenty miles north of the Nachess Pass, is but three thousand four hundred and sixty-six feet above Vancouver. On the lowest point of the summit is a shallow lake, about two hundred yards long, from which the water runs both ways. From this lake to the west the descent is exceedingly rapid. Towards the east the descent in the distance of about three-quarters of a mile is five hundred and thirty feet, to another lake, about half a mile long; from this to the large lake in which the river heads, a distance of about two miles in a direct line, the descent is five hundred and ninety-nine feet. From this last lake (Kitchelus) there is no difficulty in the way of the construction of a road of any kind, the valley of the river (Yakima) being generally wide and level, but covered in the upper part by a dense growth of timber. The largest of the lakes in the Kleallum was seven miles long and from one to three broad; they are all very deep, and are embosomed in and nearly surrounded by high mountains, being timbered with pine, fir, and white cedar. Captain McClellan examined this pass for only three miles west of the summit.

On September tenth Lieutenant Mowry returned from the Dalles, and on the sixteenth Lieutenant Hodges arrived from Steilacoom, bringing twenty-nine pack-horses loaded with provisions. He had been eleven days in returning, a much longer time than had been antici-

pated, otherwise a fuller examination of the mountains would have been made during his absence, though a better pass was still expected to be found further to the north.

A still further reduction of the force was now made, and three men, with thirty-two miserable broken-down horses, were sent to the Dalles, leaving only thirty-six persons in the party, with ninety-four animals. The provisions on hand were sufficient to last them for about seventy days.

From the various explorations in the vicinity and back to the Dalles, by Lieutenant Mowry, the following general description of the country on the eastern slope is compiled:

The country between the great bend of the Columbia and the Cascade mountains has the general character of the great plains, except that it is more undulating and even mountainous, a ridge of considerable elevation rising from the level of the Columbia, both north and south of the mouth of the Yakima, gradually towards the commencement of the wooded slopes, or from about four hundred to fifteen hundred feet above the sea. The lower part of the Yakima valley is less fit for cultivation than higher up, but contains much good grass land.

It is wide, open, and destitute of timber, except in the bottom lands, and even there few trees are found for forty miles up. Fifty-five miles up, on the branch called Athanam, occurs the first oaks met with west of the Missouri at Fort Union.

Upon the immediate banks of the river and its branches, where there is sufficient moisture in the soil, the land produces pretty well. The potatoes raised by the Indians are very fine; but melons and squashes, which they also raise, do not succeed well, perhaps on account of the seed being poor; and corn does not thrive at all.

The valleys of the various streams tributary to the Yakima vary from half a mile to three miles in width, and are bordered with terraces, which decrease in productiveness with their elevation above the water, becoming more gravelly, and, finally, like the intermediate ridges, almost destitute of vegetation.

The average width of the main stream is five or six miles, becoming, at ninety miles up, reduced to one or two miles, and the extent of cultivable land is proportionately greater than on its branches.

The ridges between the different branches of the Yakima, and separating it from the Columbia north and south, are chiefly composed of basaltic rock, generally columnar, and more or less covered with gravelly and sandy detritus. On many parts of the highest ridges the basalt has been entirely denuded, leaving nothing but angular fragments of rock, and supporting no vegetation of any value. Wherever covered with earthy materials there is a good growth of grasses, and probably the allied cereal grains might be produced, particularly the winter kind. Towards the base of the mountains the valleys, both of the main Yakima and of its branches, improve much in appearance and agricultural capacity. Yellow pine occurs, and gradually increases in amount on the banks of the streams, and about ninety miles from its mouth begins to appear on the mountain slopes, marking with rather a sudden and sharp line the border of the unwooded plains.

Going southward from the Yakima to the Dalles in September, Lieutenant Mowry followed a trail leading through the outskirts of the pine forest and over the ridge south of the Yakima, where it is about fifteen hundred feet high. He met with three extensive and rich prairies, and several smaller ones, and many parts of the ridges were covered with good bunch grass. The poorest part of the whole is the descent of the high slope to the Columbia, opposite the Dalles, which is forty miles directly south of the most southerly branch of the Yakima.

On September 20th the march towards the north was resumed, and though the hills north of the Yakima valley had not appeared very high from a distance, the trail led over a portion of them higher even than the passes of the Cascade range. Here the mountains towards the north and west were to be seen for a great distance, nothing, apparently, but mountain piled upon mountain, rugged and impassable, a great part of their summits covered with perpetual snow.

Descending from this to the Columbia river, the mouth of the "Pisquouse," the route led along its rugged western bank for four days, when, reaching Fort Okinakane, an old and ruinous establishment of the Hudson Bay Company, where Mr. Lafleur, the person in charge, informed him of a foot-trail leading from the headwaters of Methow river to Puget Sound. From September 28 to October 4 was spent in exploring this route, the whole party going as far up the river as practicable with animals, and Captain McClellan making a further survey on foot, until the roughness of the trail and the barometer assured him of its unfitness for a railroad. The following is the description of the country traversed between the Yakima and Fort Okinakane: The range separating the Yakima from the "Pisquouse," or "Wenatshapam," rises to 5,749 feet above the sea, and along its summit the mountain forests extend further to the east than they do southwards, ending a few miles east of where the trail crossed it.

The greater amount of vegetable matter and the increased moisture of these elevated tracts are causes of a superior soil in this forest.

From the summit of this ridge a view was obtained of the northwestern part of the Great Plain. It is thus described by Captain McClellan: "That portion of the Cascade range which crosses the Columbia sinks into an elevated plateau, which extends as far as the limit of vision to the eastward; this is the Spokane Plain. On it we could see no indication of water, not a single tree; except on the mountain spur, not one spot of verdure. It was of a dead, yellowish hue, with large clouds of black, blending into the general tinge, and appeared to be a 'sage desert,' with a scanty growth of dry bunch-grass, and frequent out-croppings of basalt."

The characters of the Columbia along the western border of this plain is thus described: "Through a valley of about a mile in breadth, in which not a tree is to be seen and seldom even a bush, and which is bordered by steep walls of trap, lava, and sandstone, often arranged in a succession of high plateaus, or steps, the deep blue water of the Columbia flows with a rapid, powerful current; it is the only life-like object in the desert."

"The character of the valley is much the same as far as Fort Okinakane. It occasionally widens out slightly, again it is narrowed by the mountains pressing in. Sometimes the trail passes over the lower bottom, at others elevated and extensive terraces, and in a few places over dangerous points of the mountains."

"In this portion of the valley a few small groves of pine are met with, but the general character is entire absence of trees and bushes. In places only is the grass good; but we found no difficulty in obtaining enough for the animals. The soil is so very sandy that it is not probable it can ever be applied to any useful purpose. Granite, gneiss, and syenite occur in the valley of excellent quality and in large quantities."

At the time of his visit, September, the Columbia was 371 yards wide just above the mouth of the Pisquouse, fifteen miles further up it was 329 yards wide; the surface velocity 3.6 miles, the mean velocity 2.9 miles per hour; a few miles further its velocity was nearly a mile per hour greater, these being taken where the strong current was near the shore.



Stanley del

J. Bien N.Y. lith.

FORT OKNAKANE.

The country along the Columbia between the mouth of the Pisuouse and the Yakima was not examined by any of the parties. According to Captain Wilkes, granite appears at one point underlying the basalt on the east bank, but neither rock appears opposite the mouth of the Yakima, where the banks are only about thirty feet high, and composed of sand and boulders only.

On the west side of the Columbia, around this great bend, the mountains rise almost immediately from the river bank, rugged and impassable, with forests at the height of about four hundred feet above the water, and perpetual snow on their summits towards the west. The "Pisuouse," "Enteatkwu," and "Chelan," streams emptying on that side, have no valleys at their mouths, being three rough, rocky torrents. The Chelan flows from the lake of the same name, lying in a narrow valley 474 feet above the Columbia, and at its outlet over a mile wide. It is said to run back among the mountains for about thirty miles, and steep mountains close in on its shores within eight miles from the river, which was the portion visible.

Near its mouth and northward the country is much superior to the cañon of the Columbia, being composed alternately of gently rolling prairies and wooded hills, the open tracts grassy and apparently fertile. There are probably other similar fine valleys among these mountains, which the vicinity of the navigable waters of the Columbia will render valuable in spite of the bad character of its own shores and the country east of it.

The "Methow" river, which was explored nearly to its sources, has a considerable extent of good agricultural and grazing land in its upper valley. Its lower part, for twenty miles up, is hemmed in by high wooded hills; above this, they become more rolling and grassy, and its banks are bordered by level wide terraces of better soil than those on the Yakima.

On October 5, the party proceeded northward from Fort Okinakane, along the river of that name, and on the 9th reached a point in latitude $49^{\circ} 26'$, about thirteen miles south of the "Great Lake." There is little difficulty in any part of this valley for road making; but, as it leads to no pass westward, further exploration was not necessary. The Hudson Bay trail to Fort Largley, on Fraser's river, leaves it about latitude 49° across a mountain ridge; to the west fork of the Okinakane, and another between that and Fraser's river. It is represented by all as barely practicable, and going directly across the mountains instead of through any pass.

The west fork, near the confluence, has no valley, running through an immense ravine, impracticable for any road.

On October 12, leaving the Okinakane at the forks, they travelled eastward, crossing a high ridge to a small river flowing in the Columbia, opposite Fort Colville, where they arrived on the 18th, ferrying the baggage over in canoes and swimming the animals safely over. The country traversed since leaving Fort Okinakane is thus described:

The north bank of the Columbia, between the Methow and Okinakane, is low, sandy, and barren, but rises into grassy slopes at a few miles distance, which towards their summits become covered with pine woods. The forest evidently descends lower towards the north, and with the improving grass shows the influence of more abundant rains. After going about twelve miles up the Okinakane, the country gradually improves in appearance, pines and cotton-woods grow more abundantly, and there is evidently a large extent, both of the valley and rolling hills bordering it, capable of cultivation. At sixty miles, however, lofty wooded hills close in on its banks, and thence to the 49th parallel it presents little inducement for settlement, though capable of furnishing abundance of excellent timber.

There is a fine fall on the Okinakane, thirty-five miles above its mouth, of five feet pitch, and

and about twenty miles further up, on its west fork, four miles above the junction, another fall of ten feet, both supplying abundance of water power. On the top of the lofty table of the Great Plain, opposite the mouth of Okinakane, is a considerable extent of pine woods, several thousand feet above the Columbia, into which it could be easily thrown or slid down, as the cliff is almost perpendicular. This is probably the highest point of the plain, and is the point where a spur appears to cross the river and to sink into the level of the plain.

The country between the Okinakane and the Columbia at Fort Colville, sixty miles in a direct line across, was traversed by Captain McClellan's party about fifty miles to the north of the Great Plain. Five miles from the Okinakane the "Ne-hoi-al-pit-kwu," flowing eastward, was reached, the dividing ridge being rolling and grassy, covered with forest at its summit, which is about 1,500 feet above the Okinakane, and 2,647 above the sea, as observed with an aneroid barometer.

The valley descended towards the east, though narrow, is fertile, with alternation of prairies and forest, while the hills bordering it are wooded with large trees, mostly on their northern abyses.

The general character of the country is like that north of the Spokane, but more mountainous than east of the Columbia. At Fort Colville, the line of Captain McClellan's exploration connects with that of the eastern division.

In taking a general view of the route we find that the eastern slopes of the Cascade mountains are wooded with open forests from the elevation of about 2,000 feet up, nearly to the limit of perpetual snow. The trees are chiefly the large western "yellow pine," which is the most abundant, and extends the lowest; north of the Yakima the western larch, of equal size, becomes mixed with it, and finally more abundant in many places. Besides these, the scrub pine occurs in spots of sandy soil, and a few trees of other pines, supposed to be the red, and short-leaved or "Banks" pine, (cypres of the voyageurs) occur northward. On the higher and more northern mountains there is also a small kind of white pine, and two or three kinds of spruce, small, and of little value comparatively.

Oak grows near the Dalles and along the skirt of the forest as far north as the Yakima. Cotton-wood and aspen usually line the streams, and the paper birch and a kind of cedar (juniper) grow near Fort Colville. The white cedar, or arbor-vitæ, so important west of the mountains, is not common on their eastern slope, though apparently more so on the western slope of the Bitter Root range. Among these forests of the eastern slopes there are found at intervals prairies, which are superior in character of soil to those near the Great Plain. Such is Tahk Plain, ten miles long, and from one to three wide, lying southeast of Mount Adams, and at the bank of Klikatat river, fifteen miles north of the Columbia, which has a lake in its centre, and is covered with luxuriant grass.

Among the pine forests there is almost everywhere a fine growth of grass, remaining green and fresh much later than on the lower plains and in the vallies. On the highest portion of the mountains extensive prairies are covered with the richest pasture when nearly all below is dried up, presenting the finest grazing tracts, even when too elevated for cultivation. "Chequos" prairie, 4,000 feet above the sea, is one of this kind, and there are others of much less elevation in the passes at the head of the Yakima and its branches.

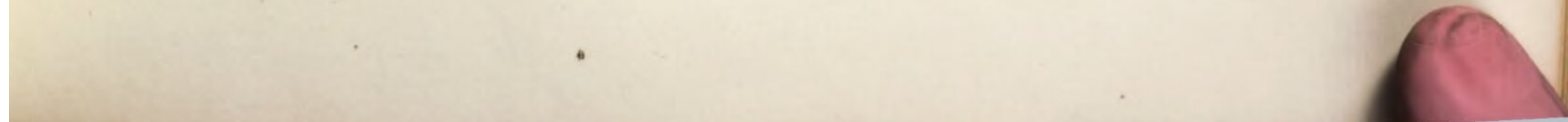
During our stay at Colville we visited McDonald's leap. Near it there is a Mission, under the charge of Père Louis, whom we visited. It is said that all through the valley of the Columbia there is trap rock veins of quartz. The Indians about the Mission are well disposed

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KETTLE FALLS COLUMBIA RIVER.

and religious. To-morrow Père Louis is to dine with us at McDonald's. As we returned to the fort Mr. Stanley was just going into camp, having made a march of 35 miles. The animals were put with McClellan's. In the evening we listened to the thrilling stories and exciting legends of McDonald, with which his memory seems to be well stored. He says intelligence had reached him, through the Blackfeet, of the coming of my party; that the Blackfeet gave most singular accounts of everything connected with us. For instance, they say that our horses have claws like the grizzly bear; they climbed up the steep rocks and held on by their claws; that their necks were like the new moon; and that their neighing was like the sound of distant thunder. McDonald has, of course, given a free translation of the reports made by the Indians. We listened to his accounts of his own thrilling adventures of his mountain life, and a description of an encounter with a party of Blackfeet is well worth relating. At the head of a party of three or four men he was met by a band of these Indians, who showed evidences of hostility. By signs he requested the chief of the Blackfeet to advance and meet him, both being unarmed. When the chief assented, and met him half way between the two parties, McDonald caught him by the hair of the head, and, holding him firmly, exacted from the remaining Indians promises to give up their arms, which they accordingly did and passed on peaceably. From Vancouver I wrote to him requesting him to give me, in writing, a store of legends, and to accompany them by notes upon the climate and nature of the country obtained by his own experience. He has lived here many years, and is an upright, intelligent, manly, and energetic man.

I now, after consultation with Captain McClellan, determined upon a continuation of operations, subject, however, to be modified by the condition of our animals on the arrival of Lieutenant Donelson. It will be seen, that though a very fine examination had been made of the eastern slope of the Cascades, no line had been run by Captain McClellan to Puget's Sound, and I deemed it of the greatest consequence to carry through such a line, so that we could speak with positiveness and certainty of the grades on the western sides, and the other facts bearing upon the question of railroad practicability. Captain McClellan was of opinion that it was possible to carry such a line through at this season of the year, although he apprehended that some difficulty might be found from the presence of snow.

I accordingly resolved to bring the whole party together at a camp south of the Spokane river, then to arrange parties so as to move to the Sound and the lower Columbia in such a way as would give the best additional knowledge of the country.

Garry this evening arrived at Colville with his wheat to be ground, and holds himself in readiness to take instructions to Lieutenant Donelson in regard to the place of meeting.

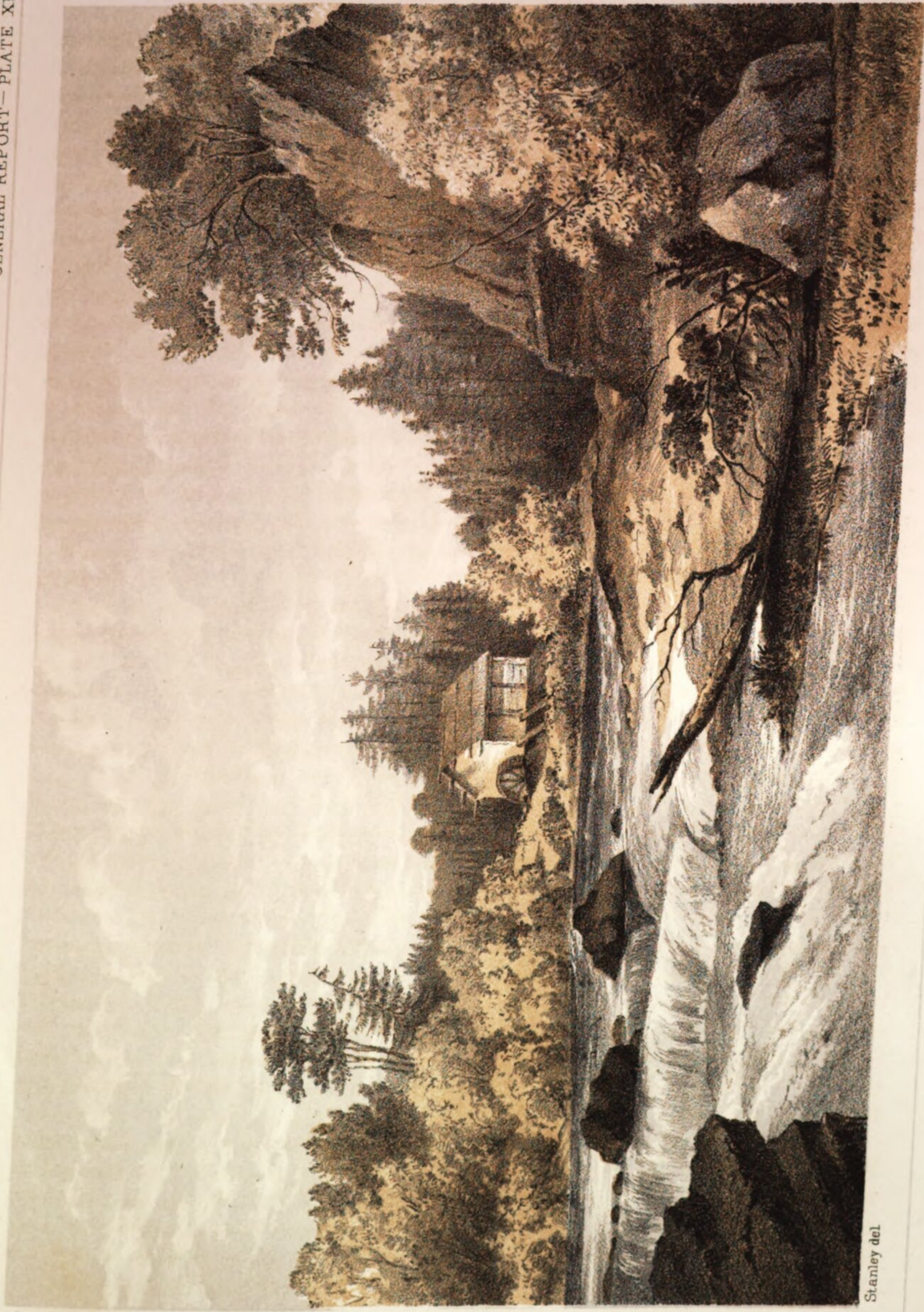
October 20.—I determined to remain here another day and to be prepared to go off to-morrow. We dined with McDonald, in company with Père Louis. In the evening I addressed the Indians, telling them of the interest government took in them, and that measures had been taken to secure a peace between the Blackfeet and all the other Indian tribes. That government would do for them what it had done for the other Indians. During the day I inspected McClellan's animals and examined further into his work.

I was much gratified to learn that Duncan has kept his field-work plotted up from day to day. The whole party seems to be well organized. I am particularly well pleased with the labor of Mr. Gibbs in connexion with Indian affairs. He is a thoroughly educated man, and combines the habits of a student with the good qualities of woodsman and mountaineer, and he has become very well acquainted with the Indian tribes through whose country the party has passed.

And not only has he become acquainted with these Indians, but he has also interested the priests at the Missions in his work, and from them he has obtained much valuable assistance. Garry started with a letter to Donelson, appointing as a place of meeting a valley south of the Spokane river, some ten or twelve miles south of the Spokane House. This spot is only a short distance off the trail leading from Walker and Eel's Mission to Walla-Walla. From inquiries concerning Dr. Suckley's route I learned that the river between the Pend d'Oreilles Mission and Colville, sixty miles, is much obstructed by rapids, and that at this season of the year it is difficult, if not dangerous, for canoe navigation. I have, therefore, determined to send a letter to Dr. Suckley at the Pend d'Oreilles Mission advising him not to take this portion of the trip by canoe without very carefully weighing the matter beforehand, suggesting to him to take horses at the Mission, with which he could be supplied by the priests. At Colville he is at liberty to take the land route with Lieutenant Arnold or to continue down the river in boats; or should Lieutenant Arnold take the river, they can, if they choose, descend together. I leave the whole matter to his own discretion, simply giving him information that he may not act unadvisedly or feel obliged to continue the trip by canoe to carry out the instructions received at St. Mary's. Lieutenant Arnold will ascend the Columbia to the 49th parallel, examining carefully near the mouth of the Clark's Fork, and ascertaining its latitude by astronomical observations. After conference again between McClellan and myself, the following programme was decided upon for our operations after meeting Donelson, subject to such modifications as may be found necessary by the condition of the animals and of the instruments in the main party. McClellan and Lander are to cross the Columbia above the mouth of the Yakima, and to carry a railroad line through the Snoqualme Pass to Puget Sound; Lieutenant Duncan to cross the Columbia just above the junction of the Snake river and pursue the trail to Vancouver on the northern bank of the river; Lieutenant Hodges, with the remainder of McClellan's party, to go directly to Walla-Walla, and thence down the Columbia. Lieutenant Donelson, with a select party, to go to the Cœur d'Aléne Mission, and thence take the trail to Walla-Walla, and the train to go to Walla-Walla under the direction of Dr. Hodges and Mr. Osgood.

October 21.—The instructions referred to yesterday for Lieutenant Arnold and Dr. Suckley were left with Mr. McDonald. Supplies, particularly flour, were purchased for the prosecution of our future operations. We also purchased goods to pay the guides of Donelson and Tinkham; those for the latter to be sent to St. Mary's by Mr. Owen, should we meet him, as is most probable. We then moved off, McDonald presenting us with a keg filled with cogniac to cheer the hearts of the members of all parties, and obliged us to take a supply of port wine. We passed his grist mill on Mill river, the only one in the neighborhood. A march of twelve miles brought us into camp, McDonald accompanying us. We had a glorious supper of smoking steaks and hot cakes, and the stories added to the relish with which it was eaten. McDonald again charmed us with a recital of his thrilling adventures, and expressed much regret that the expected arrival of the Hudson Bay express from Canada obliged him to return the next morning.

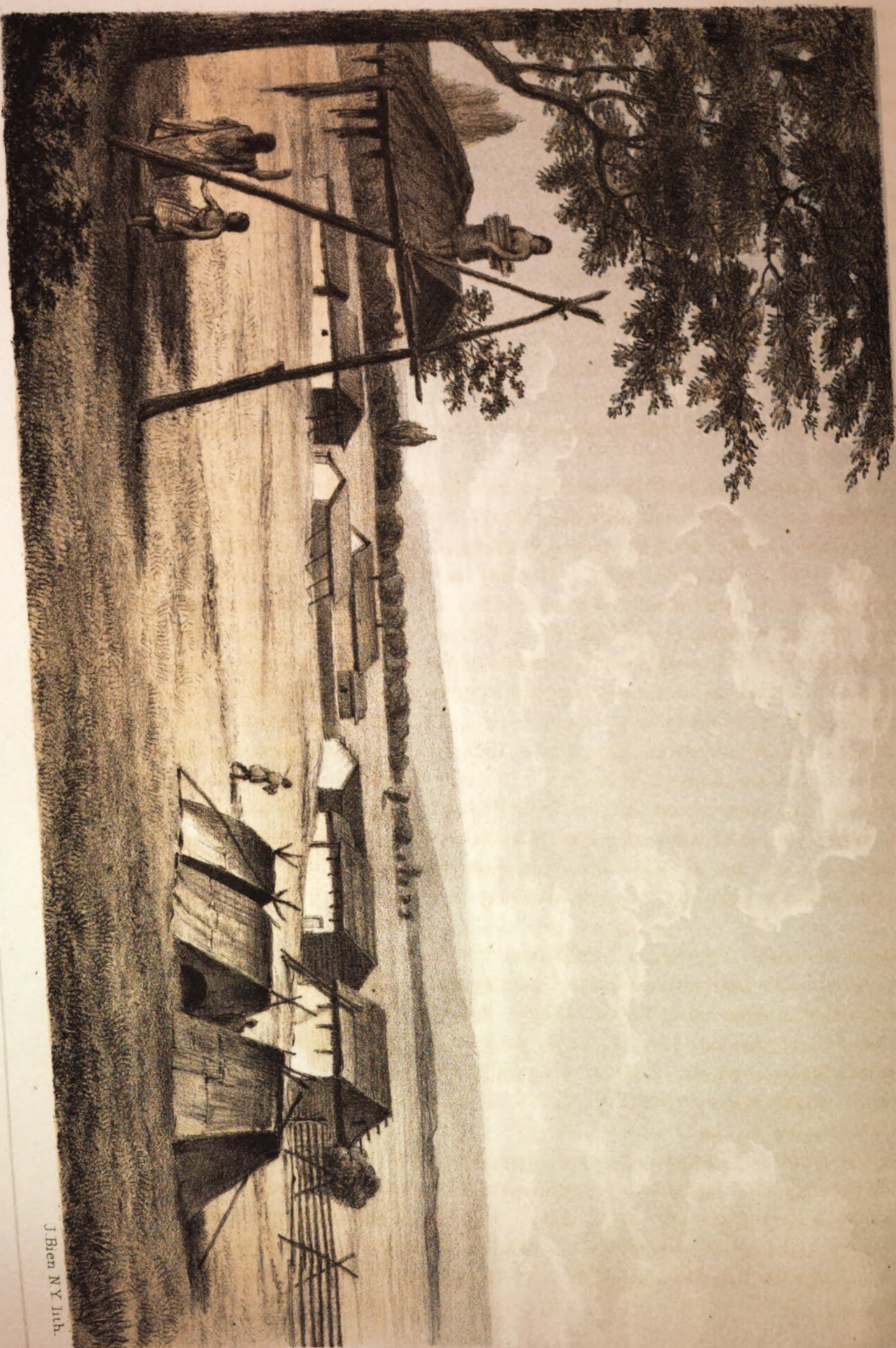
October 22.—We got off early, and at Brown's we stopped to purchase horses, and succeeded in obtaining two, one for McClellan and the other for myself. McDonald accompanied me some distance further, when, bidding each other adieu, I pushed ahead, and reaching a small stream I found that McClellan's party had taken the left bank, and that the captain, who came up afterward's with Mr. Stanley, had gone on to join them. We took the right, and thus avoided a bad crossing in which McClellan's party became involved. We encamped upon the



Stanley del

J. Bien N.Y. lith.

HUDSON BAY MILL.



Stanley del.

ISHIMIKAINÉ MISSION.

J. Bien N.Y. lith.

borders of the stream. Our train is now larger and more heavily laden than heretofore, in consequence of the increased supplies. To-day we have thirteen packs. At night we killed a cow, purchased of Brown, and we still have an ox in reserve, to be killed when we meet Donelson. The air is cool and fresh, and our appetites keen. I may say here that the two pounds of beef and half pound of flour per man is not too much for a day's allowance.

October 23.—Snow is falling this morning, and it has cleaned our beef admirably. I received a note from McClellan just after setting out saying that in consequence of yesterday's difficulty with the train he thought that he had better remain with his own train. He afterwards, at my request, joined me, leaving the train under the charge of Duncan. We journeyed but ten miles, encamping near where we had seen Antoine's family in going to Colville. The snow ceased falling about noon, with five inches upon the ground. It is light, and we think it will disappear in a few days. The Indians inform me that we shall not probably find it south of the Cœur d'Aléne river; and from their statements it would seem that this river is a dividing line as regards climate.

October 24.—We started this morning with the intention of reaching the appointed place of meeting to-night.

McClellan, Minter, Osgood, Stanley, and myself, pushed ahead, and at noon we reached the old Chemakane Mission, so called from a spring of that name near by. The Mission was occupied by Messrs. Walker and Eel; but, in 1849, in consequence of the Cayuse difficulties, it was abandoned. These gentlemen labored ardently for the good of the Indians. Walker was a good farmer and taught them agriculture, and by them his name is now mentioned with great respect. The house occupied by Walker is still standing, but Eel's has been burned down. The site of the Mission is five miles from the Spokane river, in an extensive open valley, well watered and very rich. Here we met Garry and some 200 Spokanes. Garry has forwarded the latter to Donelson, but had received no intelligence of his arrival in the Cœur d'Aléne plain. We therefore concluded to encamp here, and to-morrow McClellan and myself are to accompany Garry to the Spokane House. The route by Walker and Eel's Mission to Colville unites with that taken by us twelve or fourteen miles from the Mission. It is a better route, affording good grazing during the whole distance. The Colville or Slawntehus and Chemakane valleys have a productive soil, are one to three miles wide, are bordered by low hills, covered with larch, pine, and spruce, having also a productive soil, which gradually become broken and lower towards the south. In the evening the Indians clustered around our fire, and manifested much pleasure in our treatment of them. Gibbs was indefatigable in collecting information in regard to these Indians. I have now seen a great deal of Garry and am much pleased with him. Beneath a quiet exterior he shows himself to be a man of judgment, forecast, and great reliability, and I could see in my interview with his band the ascendancy he possesses over them. Near the Mission lives Solomon Pelter, a settler, who, by Garry's permission, has taken up his abode in this valley. I told Pelter, in reply to his request to be permitted to remain here, that though I had no power to authorize him, yet I could see no objection to his so doing; that I looked with favor upon it, and requested him to have an eye to the interests of the Indians.

I should have mentioned, in its proper place, that in Colville valley there is a line of settlements twenty-eight miles long. The settlers are persons formerly connected with the Hudson Bay Company, and they are anxious to become naturalized, and have the lands they now occupy transferred to themselves. I informed them that I could only express my hopes that their case

would be met by the passage of a special act. They are extensive farmers and raise a great deal of wheat.

October 25.—Having left the necessary directions for raising camp and moving it to the place of meeting with Donelson, agreeably to the arrangement made yesterday, Captain McClellan and myself accompanied Garry to the Spokane House, hoping there to hear from Donelson. The road was slippery, in consequence of the thawing of the snow, and we were obliged frequently to dismount. We met some Spokanes, from whom I learned that Antoine, who had been sent for horses in the morning of the 23d, had gone to meet Donelson. I sent after him, directing him to return, desiring to conclude the bargains for horses before the main train arrived. We found Garry's family in a comfortable lodge, and he informed us that he always had on hand flour, sugar, and coffee, with which he could make his friends comfortable. We then went to our new camp south of the Spokane, which had been established whilst we were visiting Garry's place. From the Chemakane Mission the train left the river, and passing through a rolling country covered with open pine woods, in five miles reached the Spokane, and crossing it by a good and winding ford ascended the plain, and in six miles, the first two of which was through open pine, reached Camp Washington.

October 26, 27, 28, and 29.—During these days I was occupied at our camp (Camp Washington) in the arrangements for moving westward. On the 27th, through our Indian friend Garry, I received a note from Lieutenant Donelson, informing me that he would reach my camp the next day. In this note he stated that he had fitted out Lieutenant Arnold for his trip to Colville, and that he would bring himself the survey of the main party, all through in good order to our point of meeting. There seemed to be nothing to prevent carrying out the programme which I had determined upon at Colville. Lieutenant Donelson arrived on the 28th, and soon we all sat down to a fine supper prepared for the occasion. All the members of the exploration were in fine spirits; our table was spread under canopy, and upon it a great variety of dishes appeared—roasted beef, bouilli, steaks, and abundance of hot bread, coffee, sugar, and our friend McDonald's good cheer. But the best dish was a beef's head, cooked by friend Minter in Texas fashion. It was placed in a hole in the ground, on a layer of hot stones, with moss and leaves around it to protect it from the dirt, and then covered up. There it remained for some five or six hours, when removing it from the place where it was deposited the skin came off without difficulty, and it presented a very tempting dish, and was enjoyed by every member of the party.

The question now was, were our animals ready for the journey? Those of Lieutenant Donelson were carefully inspected by myself, and were generally thin and leg-weary; and believing that it might be practicable to run from the Sound to the Quo-qual-nido Pass, and thus make the connexion, I was unwilling, after so much labor and fatigue had been gone through with, to assign the gentlemen to duty when they did not have confidence in their means, unless it was a case of imperative necessity. I requested the gentlemen whom I proposed to put in charge of these operations—Captain McClellan and Lieutenant Donelson—to inspect the animals and give me their judgment as to whether they would be willing to go on with the duty which I had in mind, with such means as I could furnish them. Whilst both were ready cheerfully to conform to any direction, they did not desire to go upon the duty; and accordingly, somewhat reluctantly, I determined to send the whole party to the Walla-Walla, thence to the Dalles and Vancouver, and thence to Olympia, making carefully a survey of the country on the route. I will here observe that all the gentlemen were too much

influenced in their judgment by the belief that snows would fall early and deep on the Quoqual-nido Pass, and on the route from the Cœur d'Aléne, under the base of the Bitter Root, to the Walla-Walla. The little fall of snow which I have mentioned—although in snow countries it is simply an incident of the fall, having nothing to do with betokening the approach of winter, but rather indicating, if anything, a late winter—had not been appreciated, and was thought to indicate that winter was already upon us. The necessary instructions were issued accordingly. I sent word by an Indian expressman to Lieutenant Arnold, at Colville, informing him of the arrangements, and also letters to Lieutenant Mullan and Mr. Tinkham, at Fort Owen; for I was now satisfied, from what I had gathered up on the route, that Mr. Tinkham would find great difficulty in moving over the southern Nez Percés trail to Fort Walla-Walla in December. The fall of snow varies exceedingly at short distances apart on the Bitter Root mountains, as I had then reason to believe, and as was afterwards demonstrated. I still desired that Lieutenant Donelson should go up the Cœur d'Aléne, although all the other parties went on the direct route, but he did not desire to do this. And I will again observe, that had I possessed at Camp Washington information which I gained in six days afterwards at Walla-Walla, I should have pushed the party over the Cascades in the present condition of the animals; but Captain McClellan was entitled to weight in his judgment of the route, it being upon the special field of his examination.

Having secured the services of Garry and his brother to accompany us, at 4 o'clock p. m. we left Camp Washington, and proceeding a little south of east, ascended a succession of undulating hills, to a region of high table-land, upon which a few isolated pines could here and there be seen. After journeying thirteen miles we halted at a small stream called Se-cule-selqua, near which the soil is very fertile, and the grass fine and of luxuriant growth. Like most of the streams in this region, it is bordered by willows, thorns, silver poplars, and other trees of smaller growth.

October 30.—We commenced to move at early sunrise, and, after travelling fifteen miles through a country of broken and rugged aspect, relieved by marshy places and small ponds, we made a noon halt, where there was grass and water, and near by there was a spring frequently used as a camping ground. Trap rock covers more than one-fourth of the area of the earth's surface, and in consequence of its projection the path is rendered very tedious to the animals. This portion of the prairie is almost destitute of fire-wood, but is well watered. At 3 p. m. we encamped on a small lake, twenty-two miles from our place of departure in the morning. In view of this camp were the graves of a number of Spokane Indians, indicated by mounds of stones designed to protect the bodies from the wolves, and by poles supported in an upright position by the stones. It was the usage, until within a few years past, for the Spokanes and other northern tribes toward the Pacific to slay the horses and cattle of the deceased at his grave, and also to sacrifice his other property; but they are gradually relinquishing this pernicious practice, under the influence of the counsels and example of the white man.

Garry informs us that six miles south of our present camp there is a stream called the Sin-sae-ghi-aul-tan, (crag-fish,) running to a lake still further south. He also says that the language of the Pelouse and Yakima Indians is the same, and that of the Colville and Okinakane nearly the same as the Spokane.

October 31.—We continued to follow the general course of the stream upon whose banks we were encamped, and after riding eight miles we crossed another small stream called Snae-

peene, or Narrow creek, and half a mile beyond we beheld an attractive camping ground, it being the one we desired to reach yesterday, but which was represented by Garry to be too far for the day's journey. The stream just mentioned rises in a chain of small lakes south of our last camp. These lakes abound in wild fowl, which at this season, and indeed until the last of November, are very plentiful, and they are therefore much resorted to by the Spokane and other Indians. We saw in one of these lakes, surrounded by ducks and geese, a pair of white swans, which remained to challenge our admiration after their companions had been frightened away by our approach.

Garry assures us that there is a remarkable lake called En-chush-chesh-she-luxum, or Never Freezing Water, about thirty miles to the east of this place. It is much larger than any of the lakes just mentioned, and so completely surrounded by high and precipitous rocks that it is impossible to descend to the water. It is said never to freeze, even in the most severe winters. The Indians believe that it is inhabited by buffalo, elk, deer, and all other kinds of game, which they say may be seen in the clear, transparent element. He also narrates the story of a superstition respecting a point of painted rock in Pend d'Oreille lake, situated near the place now occupied by Marshall Ogden. The Indians, he says, do not venture to pass this point, fearing that the Great Spirit may, as related in the legends, create a commotion in the water, and cause them to be swallowed up in the waves. The painted rocks are very high, and contain effigies of men and beasts, and other characters, made, as the Indians believe, by a race of men who preceded them as inhabitants of the land.

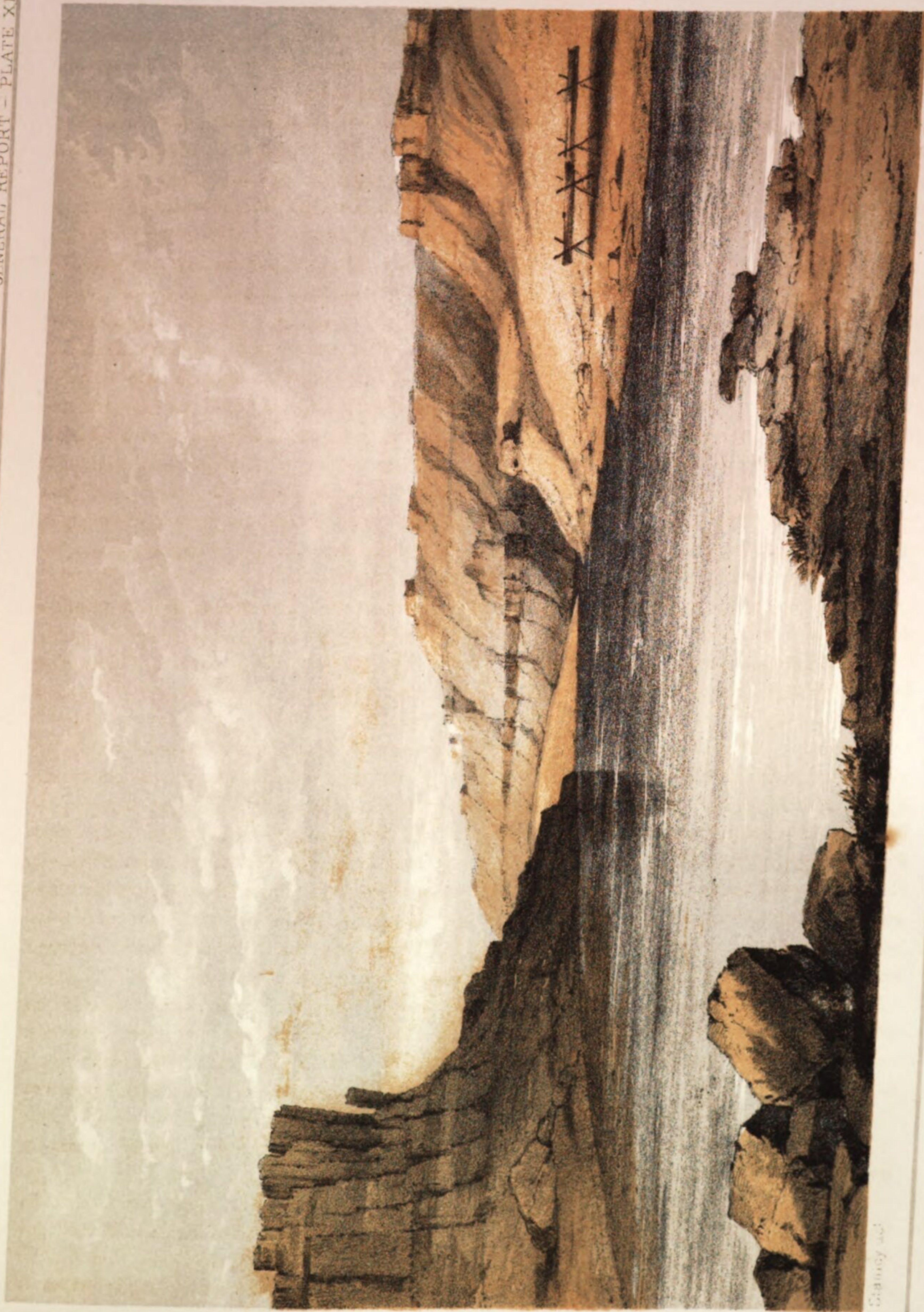
Our route to-day has been through a rocky and broken country, and after a march of 32 miles we encamped on a small stream called En-cha-rac-nae, flowing from the lake where we last halted, near a number of large natural mounds. Here we met with a discharged servant of the Hudson Bay Company and his family, on their way to the old Presbyterian mission on the Spokane river.

November 1.—Our course lay down the valley of the En-cha-rac-nae, a rugged way beset with deep clefts in the volcanic rocks. We crossed the Pelouse river near the mouth of the En-cha-rac-nae, and near the stream flowing from the never-freezing lake En-chush-chesh-she-luxum, and twelve miles from the mouth of the Pelouse. Four miles from our place of crossing the Pelouse runs through a deep cañon, surrounded by isolated volcanic buttes, to its junction with Snake river. We met two Pelouse Indians on the En-cha-rac-nae, who informed Garry that there were no Indians at the junction of the Pelouse. They accompanied us to assist in crossing our animals and baggage. On the Pelouse we fell in with two lodges of Indians, and saw a large number of horses belonging to another camp just arrived from up the river.

At 2 p. m. we arrived at the mouth of the Pelouse river, and, crossing Snake river, we encamped on its southern bank, several Pelouse Indians accompanying us, and among them a chief from a band but a few miles distant from our camp, Wi-ti-my-hoy-she. He exhibited a medal of Thomas Jefferson, dated 1801, given to his grandfather, as he alleges, by Lewis and Clarke.

Not having visited them myself, the following description of the falls of the Pelouse was kindly furnished me by Mr. Stanley, who saw them in the year 1847:

The Pelouse river flows over three steppes, each of which is estimated to have an ascent of a thousand feet. The falls descend from the middle of the lower of these steppes. There is no timber along the course of this stream, and but few willow or other bushes; yet the soil is fertile, and the grass nutritious and abundant even in winter. The fall of water, which is



J. Bien N. Y. 1874

MOUTH OF PELOUSE RIVER.



Stanley del.

J. Bien N. Y. lith.

PELOUSE FALLS.

about 30 feet wide, cannot be seen from any distant point; for, flowing through a fissure in the basaltic rock, portions of which tower above in jagged pinnacles, it suddenly descends some 125 feet into a narrow basin, and thence flows rapidly away through a deep cañon from a point in which the annexed view was sketched. The distance from the falls to Snake river is about nine miles. The valley widens considerably for about half a mile from the mouth of the Pelouse. The home of the Pelouse Indians is near this junction, where they devote much of their time to salmon fishing. The salmon ascend to the falls; but these Indians have a legend which tells of the wickedness of the Indians higher up the country, and how the Great Spirit, in his displeasure, placed the falls as a barrier to the further ascent of the salmon.

November 2.—I have referred, in an early stage of this narrative, to the condition of my health, and will state that not a day was I on the road from Fort Benton to this point that I did not suffer much. The day I made my long ride to Colville, I was so feeble and exhausted that, on making my noon halt after moving fifteen miles, I was obliged to have my bed spread in order to rest; but the idea of meeting gentlemen so soon, from whom I had so long been separated, enabled me to bear the fatigues of my afternoon fifty miles ride to Colville. Although in great suffering, I determined to move with Garry from Snake river to Fort Walla-Walla to-day, leaving Mr. Stanley to come on with my party and train in two days. I desired to save a day, in order to collect information at Walla-Walla, and to visit the Walla-Walla valley. Accordingly we set off. It required me three hours to get my courage up to the sticking point, so that I could bear the pain growing out of travelling at a gait faster than a walk; but getting warm in the saddle we increased our speed, and on reaching the Touchet we dismounted for a slight halt. Pushing on a little before two o'clock we reached Fort Walla-Walla at sundown, moving the last twenty-five miles at the rate of about eight mile an hour, and were there hospitably received by Mr. Pembrum, the factor in charge, and after a little conversation I refreshed myself with reading some late papers. On the road my time was much occupied in studying the deportment of the mountain ranges in view, and all the peculiarities of the country about me, to judge something of its winter climate and the probable falls of snow; and on reaching Walla-Walla I became satisfied from these things, and especially from a view of the highest spur of the Blue mountains in sight, that the snows of the Cascades could not be so formidable as they had been represented. I accordingly determined to search thoroughly into this matter at Walla-Walla.

November 2.—The country between the Snake and Walla-Walla rivers is over high rolling prairies. On the road I travelled the grass was uniformly good, but on leaving the Snake the first water was the Touchet, $27\frac{1}{2}$ miles distant. This was the longest march we had accomplished without water after leaving Fort Benton, perhaps the longest between the Mississippi and the Columbia. Captain McClellan, by a slight change of direction, striking the Touchet higher up, and crossing the Walla-Walla valley by a more central line, found good water and camps at less than 20 miles apart.

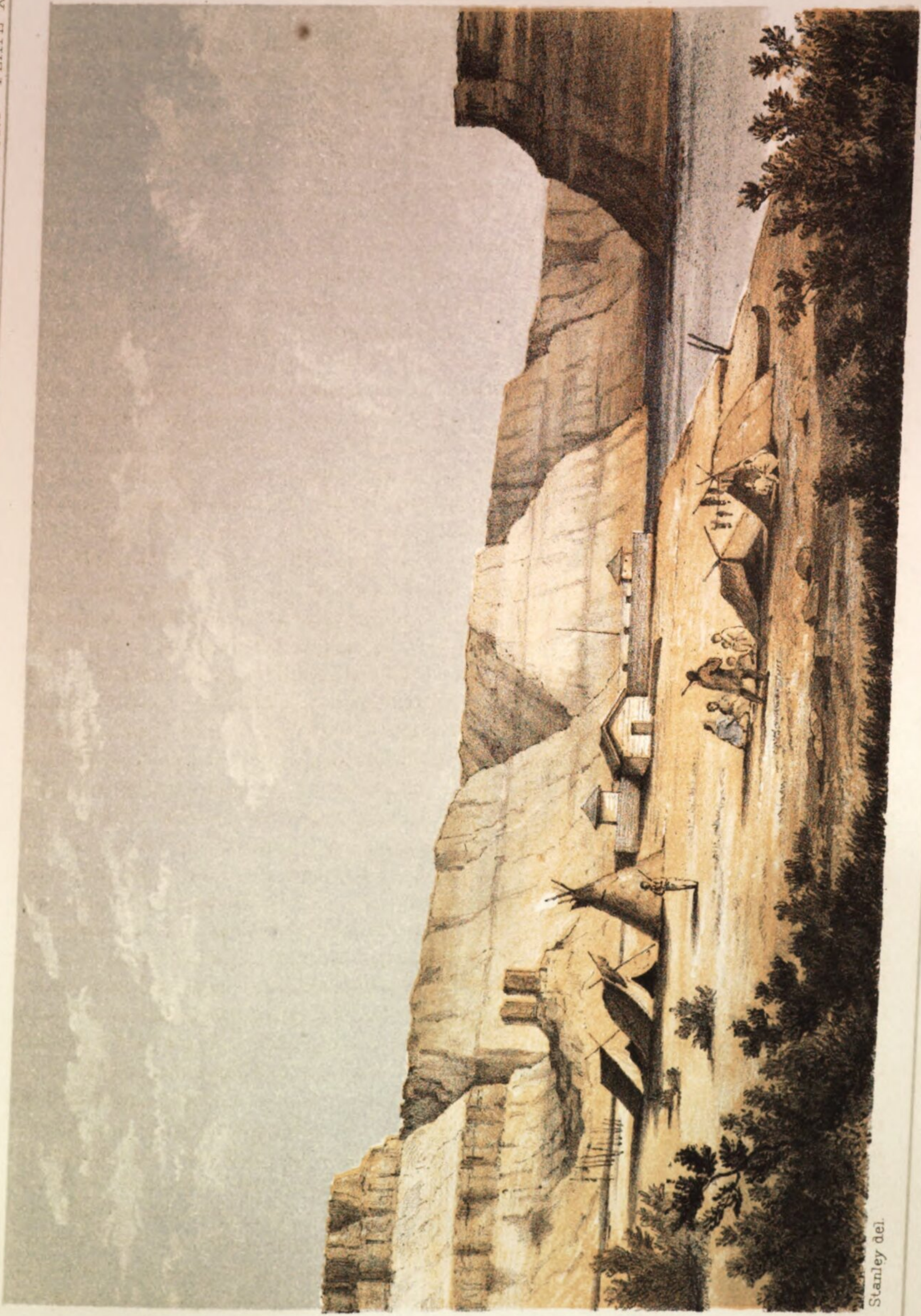
November 3 to 8.—I remained in the Walla-Walla country during these days, spending two days up the valley, and the remaining days at the fort. The valley which I visited on the 4th and 5th of November I was greatly pleased with. Mr. Stanley, with the train, reached the fort on the 3d, and on—

November 4.—We started upon the trip through this valley, riding upon our horses. Arriving at the Hudson Bay farm, we exchanged them for fresh ones, sending back to Walla-Walla the old ones by an Indian. This farm is 18 miles from Walla-Walla, and is a fine tract of land, well

adapted to grazing or cultivation. It is naturally bounded by streams, and is equivalent to a mile square. There is the richest grass here that we have seen since leaving St. Mary's. Two herders tend their animals, and a small house is erected for their accommodation. From this we went to McBane's house, a retired factor of the company, from whence we had a fine view of the southern portion of the valley, which is watered by many tributaries from the Blue mountains. The land here is very nutritious. McBane was in charge of Fort Walla-Walla during the occurrence of the Cayuse difficulties. Thirty miles from Walla-Walla, and near McBane's, lives Father Chereux, a missionary of the Catholic order, who, with two laymen, exercises his influence among the surrounding tribes. A party of emigrants, who had lost nearly all their animals, are sheltered here at this time. From Chereux and McBane I learned that the emigrants frequently cast wishful eyes upon the valley, but having made no arrangement with the Indians they are unable to settle here.

November 5.—We remained with Mr. McBane over night and returned to the fort to-day by the way of the Whitman's mission, now occupied by Bumford and Brooke. They were harvesting, and I saw as fine potatoes as ever I beheld—many weighing 2 pounds, and one weighing 5½. Their carrots and beets, too, were of extraordinary size. Mr. Whitman must have done a great deal of good for the Indians. His mission is situated upon a fine tract of land, and he had erected a saw and grist mill. It is said that his death was brought about by the false reports of a troublesome half-breed, who reported having heard Mrs. Whitman say to her husband, when speaking of the Indians, "We will get rid of them some day." From Bumford's to the mouth of the Touchet are many farms mostly occupied by the retired employés of the Hudson Bay Company. On our return we met Pu-pu-mux-mux, the Walla-Walla chief, known and respected far and wide. He possesses not so much intelligence and energy as Garry, but he has some gifts of which the latter is deprived. He is of dignified manner, and well qualified to manage men. He owns over 2,000 horses, besides many cattle, and has a farm near the Hudson Bay farm. On the occurrence of the Cayuse war he was invited to join them, but steadily refused. After their destruction of the mission he was asked to share the spoils, and again refused. They then taunted him with being afraid of the whites, to which he replied, "I am not afraid of the whites, nor am I afraid of the Cayuse. I defy your whole band. I will plant my three lodges on the border of my own territory, at the mouth of the Touchet, and there I will meet you if you dare to attack me." He accordingly moved his lodges to this point, and remained there three or four weeks. Stanley was on his way from Walker and Eels' mission to Whitman's mission, and, indeed, was actually within three miles of the mission when he learned of the terrible tragedy which had been enacted there, and the information was brought to him by an Indian of Pu-pu-mux-mux's band. Pu-pu-mux-mux has saved up a large amount of money, (probably as much as \$5,000,) still he is generous, and frequently gives an ox and other articles of value to his neighbors. Some of his people having made a contract to ferry the emigrants across the river who crossed the Cascades this year, and then having refused to execute it, he compelled them to carry it out faithfully, and, mounting his horse, he thrashed them until they complied. He has the air of a substantial farmer.

Mr. Osgood moved off with my little party on the 6th for the Dalles, I having, with Mr. Stanley, determined to go down the river in a canoe, to make an examination of it; on which day I had the pleasure of making the acquaintance of Pu-pu-mux-mux in person. I ascertained from Mr. Pembrum, Pu-pu-mux-mux, and other persons, that the Nachess Pass was fre-



J. Bien N.Y. lith.

OLD FORT WALLA WALLA.



Stanley del.

COLUMBIA RIVER. JUNCTION OF DES CHUTES

J. Bion N.Y. lith.

quently open until December. Mr. Pembrum's own father took a band of horses from Walla-Walla to Steilacoom, some years since, in the month of December; and I sent for and closely interrogated one of the voyageurs who was with the party, and who fully confirmed the statement of Mr. Pembrum. The military road had been so far opened from Fort Walla-Walla to Fort Steilacoom as to be practicable for wagons, and I now determined to send Mr. Lander over this route, in order to run our line for Puget's Sound.

Accordingly I made arrangements with Mr. Pembrum to furnish animals for this duty, and gave to Mr. Lander the necessary written instructions. Under previous arrangements, made at Camp Washington, his duty was, in connexion with the odometer survey, to continue the examination down the valley of the Columbia; but this work I considered as essentially done by the operations of Lieutenant Saxton, and by what would be done by the other parties, and especially by my own personal observation; for before leaving the city of Washington I had made myself acquainted with the character of the country between the Columbia river and Puget Sound, and knew that it was so favorable that it had been an idea, presented years ago, to connect their waters by a canal, so easy were the grades, and so low was the dividing ridge. The Columbia valley itself was the valley of a great stream; and the reports which we had of it from previous explorers—from Frémont, Captain Wilkes, and the many narratives both of American and British traders and employés—left it certain, in the minds of all reflecting and investigating gentlemen, that the route was practicable. I conceived it to be my duty so to manage the exploration as to develop unknown facts and extend existing knowledge. Hence my desire to run the line over the Cascades to the Sound. On the 6th Lieutenant Donelson, and on the morning of the 7th Captain McClellan, reached Walla-Walla, where they made their arrangements to continue down the river.

Before, however, I start down the Columbia river I will give the incidents of Lieutenant McFeeley's return trip to the Dalles.

Crossing by the route of the southern Nez Percés trail, Lieutenant McFeeley, for eight days, continued climbing mountain after mountain, the difficulties increasing as he proceeded; the mountains seemed to have no dividing ridge, but are an immense mass, broken into conical peaks and lateral spurs, and all thrown together and piled one upon another in wildest confusion. On the summit of two of the mountains he found snow to the depth of three or four inches, and it was still snowing there, while in descending into the valley it changed into sleet and rain. This was between the 7th and 15th of September.

One of the soldiers with him lost the track in the snow, and was left behind, after two days' search, but finally found his way to the plains, and was taken care of by the Nez Percés Indians. Seventeen of his horses gave out on the way, which had been, however, exhausted previously by carrying provisions from Fort Dalles to Bitter Root valley.

November 8.—Having given Mr. Lander his written instructions, and in conversation endeavored to impress him with the entire feasibility of the enterprise intrusted to him, I started down the river in a canoe, and reached the Dalles on the 12th. We took with us two days' provisions, and were four days in reaching the Dalles, having been detained nearly two days in camp by a high wind which blew up the river; but we eked out our scanty stores by the salmon generously furnished us by the Indian bands near us. At the principal rapids I got out and observed the movements of the canoe through them, and from the best examination which I was able to make I became at once convinced that the river was probably navigable for steamers—at all events, worthy of being experimentally tested. I remained at the Dalles on the 13th to make arrange-

ments for the moving forward of the parties and for the herding of the animals, looking to a resumption of the survey, where I was the guest of Major Rains, and had a most pleasant time, meeting old acquaintances and making new ones with the gentlemen of the post. On the 14th I reached the Cascades, where I passed the night. Here I met several gentlemen—men who had crossed the plains, and who had made farms in several States and in Oregon or Washington—who had carefully examined the Yakima country for new locations, and who impressed me with the importance of it as an agricultural and grazing country. November 15th we went down the river in a canoe, and on the 16th reached Vancouver, where I remained the 17th, 18th, and 19th, as the guest of Colonel Bonneville, and where I became also acquainted with the officers of the Hudson Bay Company.

Leaving Vancouver on the 20th, I reached Olympia on the 25th, where for the first time I saw the waters of Puget Sound. No special incident worthy of remark occurred on the journey, except that I was four days going up the Cowlitz, in drenching rains, and two nights had the pleasure of camping out. I will now advise voyageurs in the interior, when they get suddenly into the rains west of the Cascades, to take off their buckskin underclothing. I neglected to do this, and among the many agreeabilities of this trip of the Cowlitz was to have the underclothing of buckskin entirely wet through. I was enabled to examine the country pretty carefully all the way to Olympia, and had with me a very intelligent man who could point out localities and inform me about the country not in view of the road; and I saw that not only was it entirely practicable for a railroad line to the sound, but that the work was light, and the material for construction of all kinds entirely inexhaustible. There was building stone, there was timber, there was sand, materials for ballasting, and inconsiderable rock cutting. After considerable delays at Vancouver, the gentlemen of the parties under Captain McClellan and Lieutenant Donelson arrived at Olympia for office duty, being preceded a few days by Mr. Lander, who, for reasons not conclusive to my mind, did not persevere in the examination of the Nachess Pass. One of his reasons for not continuing his examination was, that it was not on the railroad line; which did not apply, because that fact was well known to him previously, having been announced to him positively in my written instructions. I did not censure Mr. Lander for not continuing on this duty, as I know the perplexity of mind in which one is placed by the contradictory character of the information gained; but I resolved to get my line to the sound, and accordingly despatched an express to the Walla-Walla, directing Mr. Tinkham on his arrival at that point to cross to Puget Sound by the Quo-qual-nido Pass, my object being two-fold: to get at some facts which would decisively settle the question of the depth of snow, in regard to which Captain McClellan and myself differed, as well as really to connect our work with the sound itself. I will here observe that Mr. Gibbs, instead of accompanying Captain McClellan to the sound, under his directions, went to Astoria and thence to Shoalwater bay, in order to examine the country. The following is a summary of his report:

MR. GIBBS' REPORT.

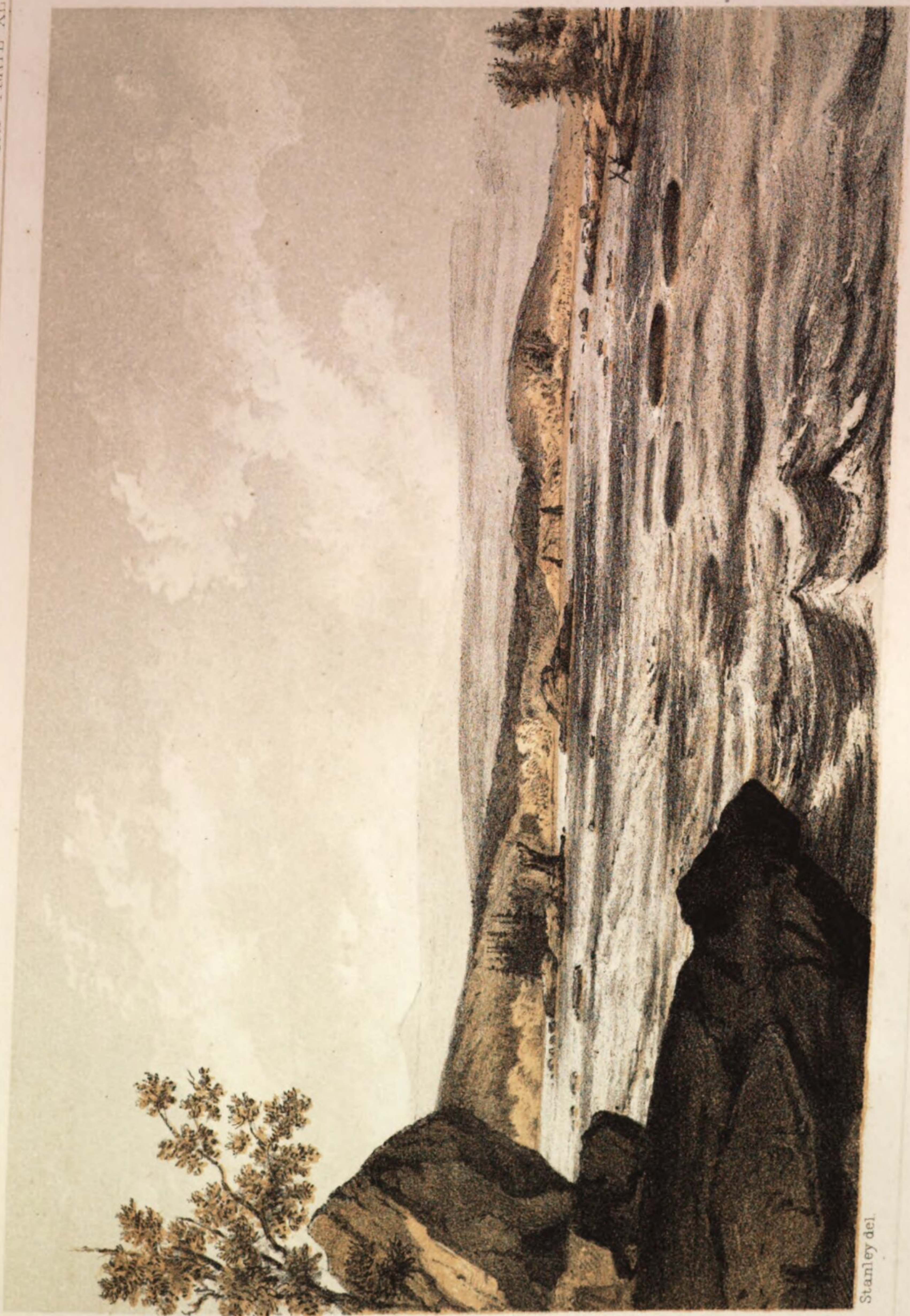
Soon after the arrival of the expedition at Vancouver, Mr. Gibbs was sent by me with directions to make a reconnaissance of the country about Shoalwater bay, a large sheet of water just north of the mouth of the Columbia, which was beginning to attract much attention from the profitable trade in oysters lately sprung up there, though the existence of such a large bay was only made known within a year, having been overlooked by all the navigators who explored the coast.



Stanley del.

J. Bien N.Y. lith.

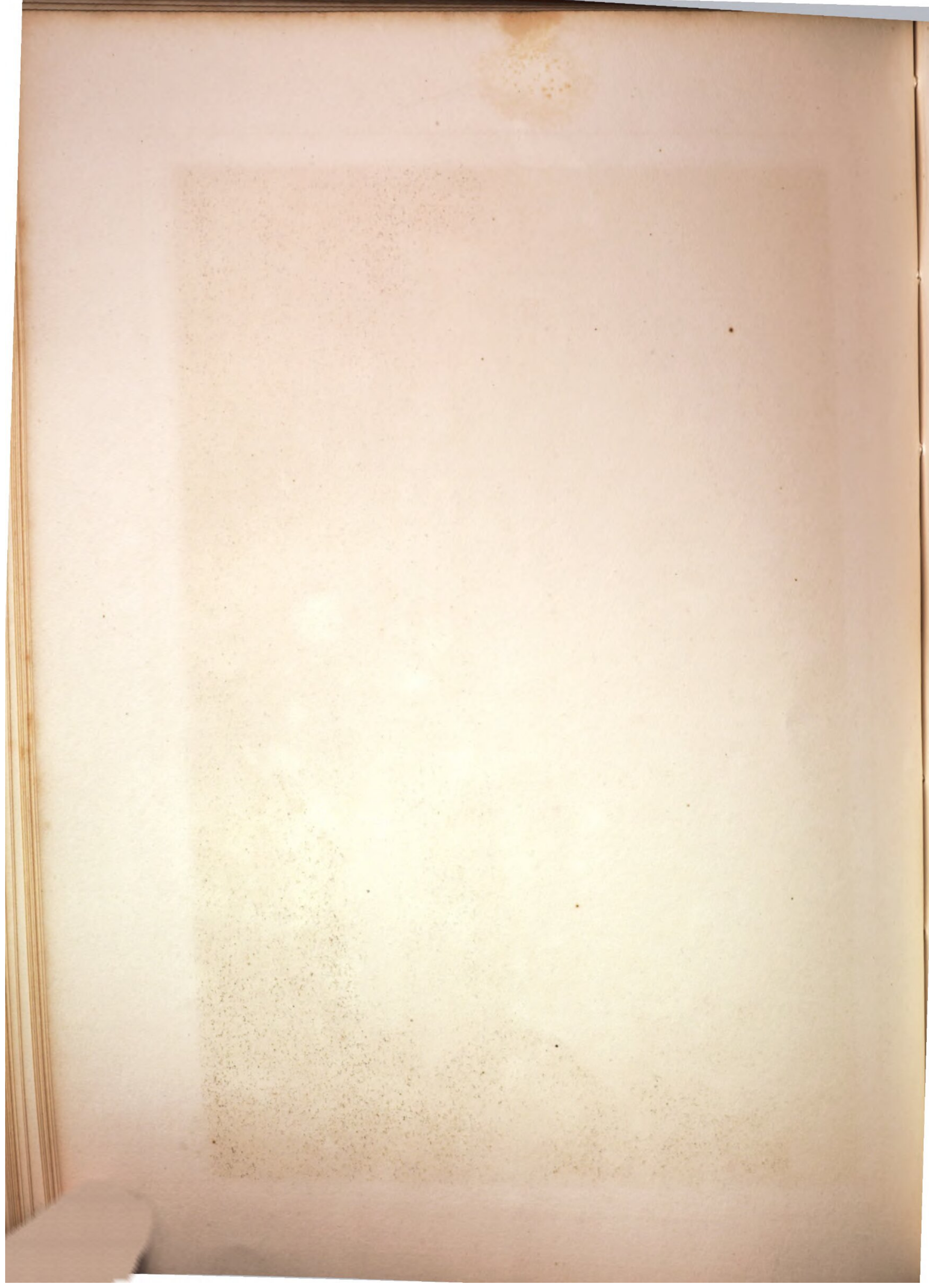
DAILES.



Stanley del.

J. Bien N. Y. lith.

CASCADES OF THE COLUMBIA.

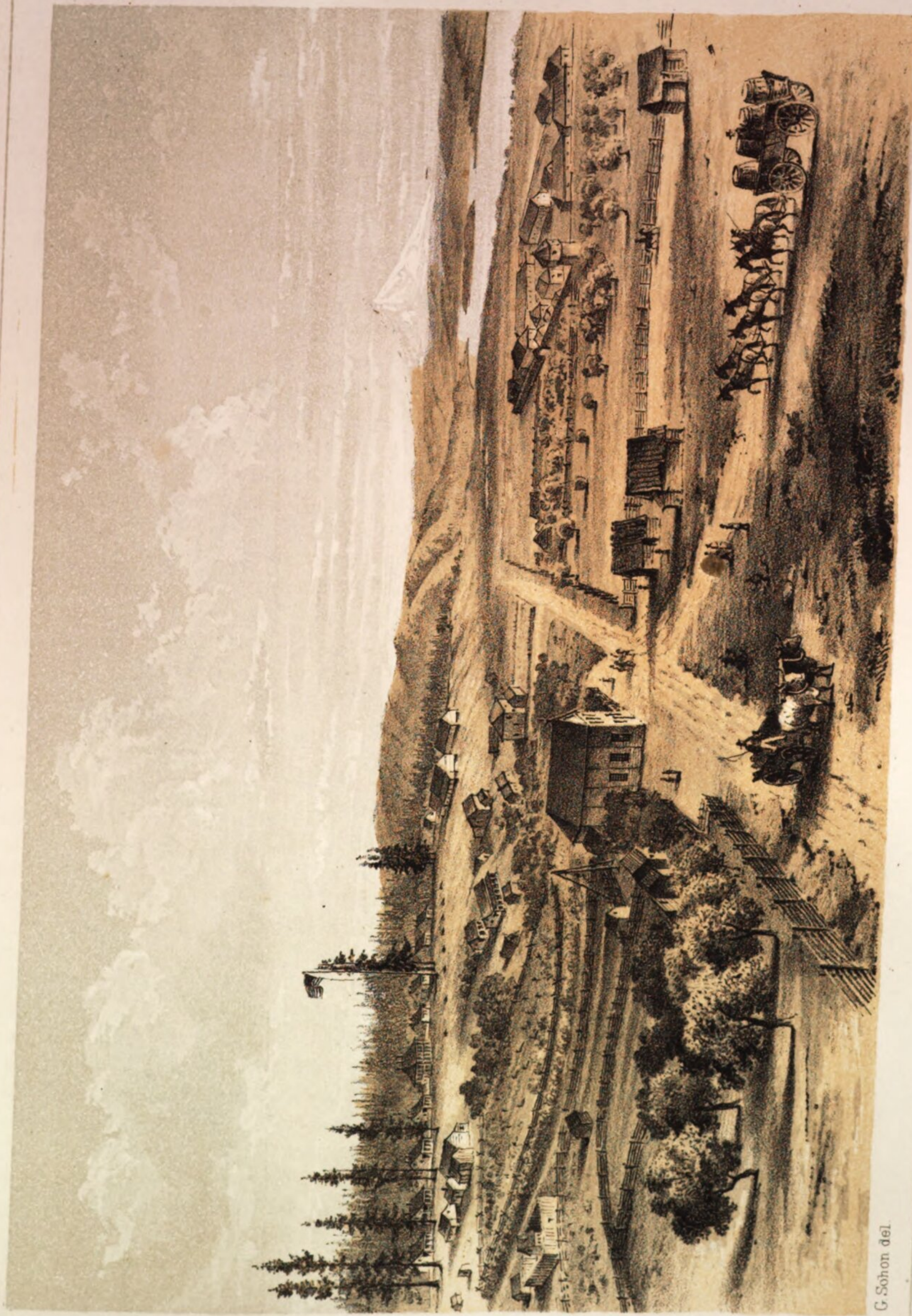




Stanley del.

J. Bien N. Y. lith.

CAPE HORN - COLUMBIA RIVER.



G. Schen del.

J. Bien N Y lith.

FORT VANCOUVER. W. T.

Going down the Columbia by steamboat he reached Baker's bay, and crossed the narrow neck of land, three or four miles wide, which separates the Columbia at that point from Shoal-water bay. Passing through this in a small boat, he was enabled to make a general sketch of its outlines, connecting the southern and larger end with the northern, which had been partially surveyed by the officers of the United States Coast Surveying steamer Active. Its length he estimates at thirty miles, and its width to average eight. Its entrance, lying twenty-five miles north of the Columbia river, is six miles wide, and has two channels, with 3 to 3½ fathoms depth, and the northern one a good beating channel.

The greater part of the bay becomes bare at very low tides, though from four to fifteen fathoms remain in the channels, affording good anchorage at several convenient points.

Between the south end of the bay and the Columbia the land is so low that a canal of a few hundred yards length would connect the waters, and make a free navigation for small steamboats as far as the head of tide-water in the Willopah, which runs into its north end, a distance of forty miles in the direction of Olympia.

The peninsula separating the south end of this bay from the Pacific is not over a mile wide, and consists, in great part, of sandy prairie, with some salt marsh and cranberry swamps. A similar tract extends from the mouth of the bay north to Gray's harbor, twenty-one miles distant, and the beach of both portions is hard sand, over which loaded wagons may be driven.

Three considerable rivers empty from the Coast range with the bay from the east, the Willopah, Naysal, and Co-palux, (usually abbreviated into Palux.)

The tide flows up these from five to fifteen miles, and so far vessels can easily go. Large barques have loaded with lumber several miles up the Willopah, which is the largest, and a considerable amount of piles and square timber has been shipped from different parts of the bay to San Francisco. The country bordering it, except along the sea beach, is heavily wooded with fir, spruce, hemlock, and cedar, (*Arbor vitæ*), and along the river is fine maple and alder, all easily accessible, and for cutting which a saw mill has already been erected. Besides several claims taken for farming and lumbering, a settlement has grown up from the oyster trade at the north end of the bay, opposite the entrance. The oysters are gathered, in great part, by Indians, from whom they are bought by the white settlers in exchange for goods, and sold alongside the vessel for \$1 50 per bushel, but in San Francisco are worth \$7, there being much loss in their transportation. Fall salmon, sturgeon, and other fish are abundant, promising a profitable fishing at a future period.

The principal object of his journey being to explore a route connecting this bay with the interior, he learned on inquiry that an old Indian trail, unused for many years since the extinction of the tribe through whose country it ran, led from some point on the Willopah across the coast hills to the road leading from the Cowlitz to Puget Sound, and that the journey could be made in two days. He found it, however, impossible to obtain Indian guides at that season, the few remaining at the bay who had ever travelled it representing it as entirely overgrown and difficult to follow. Three of the citizens, however, Majors J. L. Brown, Charles Stuart, and Samuel Woodward, volunteered to accompany him, and he concluded, at least, to make the attempt. On December 17 they went fifteen miles up the Willopah in a canoe, and then started on foot, taking six days' provisions. The densely wooded nature of the hills and the rainy weather preventing them from picking a route along the ridges, they were compelled to follow the valley, occasionally fording the river at the bends. Finding, after three days' travel, (having to cut a way for long distances through the underbrush,) that they

had only made fifteen miles, and being apprehensive that they might be caught in a snow-storm, they concluded to return, having ascertained the general direction of the valley, and marked the beginning of the route.

The lower part of the Willopah is bordered by tide-lands, much of them excellent for grazing, and parts for cultivation. The river is a mile wide at its mouth, narrowing to twenty-five yards beyond the influence of the tides, which is also about the width of its channel at low tide. Above this it is a rapid, shallow stream, navigable only for canoes, very winding, and with some bottom land subject to overflow. At the head of navigation also open prairies commence, varying from thirty to five hundred acres in extent; the rest of the valley is level, but covered with timber, mostly vine maple, easily cleared. The whole valley above tide-water embraces an area twenty miles long and ten wide. Towards the head of the river the hills separating it from the Chehalis and Columbia appeared quite low.

From observation, as well as from the reports of the Indians, this could form no serious obstacle to a road towards the sound, which could probably be made very complete for \$50 per mile. Being instructed, also, to inquire concerning other routes between the mouth of the Columbia and the sound, he learned that, up the branch called Gray's river, there was a valley narrower than that of the Willopah, lightly timbered, and with a rich black soil, through which, and over a range of hills, there could probably be made a good road to the upper Chehalis, where it would intersect the Cowlitz road. Another route would lead up the Elokamin or Strong's river from Cathlamet to the same points, having the advantage of an excellent landing for the steamers on the Columbia at all seasons. The importance of a direct communication between so important a harbor as Shoalwater bay and the sound is obvious; and the connexion once established across the Coast range, would make the distance from the mouth of the Columbia forty-five miles by steamboat, and not over eighty by land, while it is at present sixty by steamboat, thirty by canoes up the Cowlitz, and fifty by land to Olympia.

Previous to the arrival of Captain McClellan I had sent for gentlemen who had crossed the Snoqualme Pass and the Nachess, men of intelligence and known reliability, and conferred with them carefully in regard to the character of the route, the probable depth of snow, and the habits of the Indians, as to crossing them in the winter; and learned that it was no uncommon thing for Indians on horseback to come from the Yakima country, through the Quo-qual-nido Pass, to the sound in the months of winter. I need not tell the reader the kind of population that is to be found in a distant Territory. They have crossed the mountains, and made the long distance from the valley of the Mississippi to their homes on the Pacific; they have done so frequently, having to cut out roads as they went, and knowing little of the difficulties before them. They are therefore men of observation, of experience, of enterprise, and men who at home had, by industry and frugality, secured a competency and the respect of their neighbors; for it must be known that our emigrants travel in parties, and those go together who were acquaintances at home, because they mutually confide in each other. I was struck with the high qualities of the frontier people, and soon learned how to confide in them, and to gather information from them.

Soon after Captain McClellan's arrival I directed him to go down the sound, make an examination of the several harbors which come into competition for the depot of a railroad, and to take up from the sound the line of railroad to the Quo-qual-nido Pass; and soon afterwards, with Mr. Gibbs, I went down the sound myself, in order to visit and take a census of the Indian tribes, learn something of the general character of the sound and its harbors, and

to visit Vancouver's island and its principal port, Victoria. In the discharge of this duty, which was done on a little Newport sail-boat, called the "Sarah Stone," I visited Steilacoom, Seattle, Skagit Head, Pennis cave, the mouth of the Skagit and the Kamish rivers, Bellingham Bay, passed up the channel De Rosario and down the channel De Haro to Victoria, and on my return made Port Townsend and several other points on the western shore of the sound. We examined the coal mines back of Seattle and at Bellingham Bay, and saw a large body of Indians of nearly all the tribes. I became greatly impressed with the important advantage of Seattle, and also of the importance of the disputed islands. Port Townsend, as described by Vancouver, is also an admirable harbor. Much has been said by persons who never saw Puget Sound of its fogs, but the term fog is not in the mouth of any person who ever saw that sound. I have been on the waters of the sound many weeks, and that, too, in the depth of winter, in little vessels of four to six tons, and we never found any difficulty in moving with safety. In a geographical description which I shall give of this country, the harbors, resources, and geographical position of Puget Sound will be presented, as well as the character of the country generally, in connexion with it west of the Cascade mountains; but I will observe that, in my subsequent labors as Indian superintendent, I visited every point on the Straits of Fuca down to Neah bay, and to the ocean on the opposite side, have been down the Chehalis river, examined Shoalwater bay, crossed over the trail which was abandoned by Mr. Gibbs from the Willopah to the Cowlitz Landing; and my Indian agents have traversed the country much between the waters of the sound and the Pacific. The Indian Agent Simmons and Special Agent Shaw have gone by land from Neah bay, west of the Coast range, to Gray's harbor; also from the Qui-naitl river, midway between Grey's harbor and Neah bay, to the head of Hood's Canal, and from the Chehalis river, along several lines, to the Satsop, Black river and other lines to the head of the canal and the head of the sound. In the volunteer service much information was also gained of this country, and I have freely made use of everything at my disposal in giving the geographical description; but I shall state nothing of the entire accuracy of which I am not satisfied.

I will remark that, previous to my visit down the sound, both Dr. Suckley and Lieutenant Arnold reached Olympia. Lieutenant Arnold executed the instructions which he had received from Lieutenant Donelson, to proceed to Colville from Clark's Fork, though, in crossing the intermediate divide, he encountered a considerable fall of snow, which, on the divide, accumulated to the depth of two feet, it being the snow which fell but a few inches deep in the Colville valley.

LIEUTENANT ARNOLD'S REPORT.

Lieutenant Arnold ascended the Columbia from Fort Colville to the mouth of Clark's Fork in a canoe, returning in the same way, between the 3d and 8th of November. The weather during the whole trip was very unfavorable for observations of the country or of latitude; and the only one he could make was about three and a half miles above the mouth of Clark's Fork, in latitude $49^{\circ} 3' 25''$.

On the 4th and 5th snow fell to the depth of six inches, and the mountains bordering the river allowed of no extended view, and presented a remarkable similarity and an unbroken line, except where the principal tributaries broke through them. A narrow level belt of bottom-land bordered the stream, partly composed of prairies from four to six miles in length and one or two miles wide—the rest, like the mountains, thickly wooded.

The river has a rapid current and is filled with innumerable small rapids, but that known as the "Little Dalles" is the only one that would impede navigation. Here the stream is only about twenty feet wide, its sides of solid rock; the current, at that season very rapid, though the water was low, becomes at the highest floods a perfect torrent. A portage of half a mile was made in ascending, but in descending he ran through it, although innumerable eddies and whirlpools rendered the navigation in canoes rather precarious. Above Clark's Fork the Columbia continues much larger than any of its tributaries, and has a swifter and deeper current than below. Only one large stream comes in on the west, nearly opposite to Fort Colville, (the Ne-hoi-al-pit-kwu,) and another above the Little Dalles, at that time a mere brook. The only one on the east side worth mentioning is Clark's Fork.

This noble stream runs through a deep gorge in the range, about a quarter of a mile from the main stream, and has two falls, one near the gorge and one at its mouth, and empties into the Columbia with a roar. The fall near the gorge is about three feet in height; that at its mouth fifteen feet, and not more than one hundred and fifty yards wide.

The Columbia, at Fort Colville, is about three hundred and fifty yards wide just above the Schwan-ate-koo, or Kettle Falls. These consist of two pitches, one of fifteen feet and another below it of ten, and the river is narrowed to two hundred yards. An extensive and fertile bottom-land borders the river here, and extends back towards the east for some miles. This continues to border the river, with an average width of half a mile, for twenty miles down the stream, when the wooded hills come closer to the banks, higher and with numerous ravines opening on the river, which make a route close to its banks impossible. Small lakes occur among these hills, and timber is abundant as far as the Spokane river, a distance of twenty-five miles further. The soil is good, being composed of sand and alluvium. The western bank of the Columbia there has a barren appearance, and the hills rise from it to the height of a thousand feet, receding from the river, where it takes a great bend to the west, and nearly destitute of timber.

The Spokane at its mouth is two hundred feet wide, with a rocky bottom, fordable two miles above its mouth. Its banks are very high, of precipitous basaltic rock, leaving a narrow valley between of good soil. Twenty miles up, where crossed by Captain McClellan, it is little more than a brook at low water, seventy-five feet wide and three deep.

From Lieutenant Arnold's observations along the Columbia to the "Grand Coulée," and from the appearances east of Fort Okinakane, it appears that the character of the tract, between the Columbia and Okinakane, gradually approaches that of the Great Plain towards the south, though more uneven and probably much better supplied with grass. The woods extend but little south of where Captain McClellan crossed it, except on the Columbia, where they extend to the Spokane, on its banks, and occur at scattered intervals below.

The Great Plain was crossed by Lieutenant Arnold sixty miles west of the route of the main expedition. He followed down the Columbia where it turns to the west, below the mouth of the Spokane, by a very rocky and dangerous trail for fifty miles, as far as the mouth of the "Grand Coulée." The northern banks of the river appeared impassable. Timber continues along the slopes and cliffs, gradually diminishing, and almost entirely disappearing at last. The river runs far below the general level of the Great Plain. The Grand Coulée is about ten miles wide where it opens on the river at its northern end, which is a hundred feet above the water, and gradually widens towards the south; its walls eight hundred feet high, and formed of solid basaltic rock, but diminish in height southward as the bottom rose towards the summit

of the plain, until, in twenty miles distance, they ended. Numerous lateral ravines and cañons were seen running in various directions, some of them containing lakes without outlet, and streams ten feet wide and two feet deep.

The Cascade mountains were visible at the middle of the route, though from that of Captain McClellan they could not be seen. Trees entirely disappeared south of the Columbia. The trail again approaches to within twelve miles of the Columbia, about forty-five miles north of the mouth of the Yakima, and crosses a track of drifting sand-hills four miles wide, and which extend westward as far as the eye could distinguish, the gorge through which the Columbia flows being visible the whole distance. From ten miles above the Yakima to the mouth of Snake river the country is level, low, and sandy, and the banks of the latter river, for a mile up the stream, are not more than ten to thirty feet high. The direct distance across the plain, from north to south, is from ninety to a hundred and twenty miles on all the routes traversed. The wooded hills, being the spurs of the Bitter Root mountains, border it on the east, and the Great Bend of the Columbia runs round its western portion, making the width of the woodless portion, from east to west, from one hundred and twenty to one hundred and forty miles. On the west side of the Columbia Mr. Doty found a sandy, barren sage-plain, one or two miles in width, bounded by high ridges of basaltic rock parallel to the river, between the mouth of the Walla-Walla and the Yakima.

Dr. Suckley had a very successful canoe trip, although greatly disappointed in not having been able to procure the means at the lower Pend d'Oreille Mission to make the distance from that point to Colville by water. I had not intended at Colville to do otherwise than advise Dr. Suckley of the difficulties of the water route between these two points, and to suggest simply, looking to his own safety, the coming over by land; but the good fathers of the Mission, in their care for his safety and their personal regard for him, refused to let him have canoes or an Indian guide.

DOCTOR SUCKLEY'S TRIP.

Dr. Suckley, in preparing for his voyage down the Bitter Root, found considerable difficulty in constructing a canoe suitable for the purpose, as the Indians and white inhabitants were totally unacquainted with any means of navigating the river, neither boat nor canoe having ever ascended higher than the Horse Plain, at the junction of the Bitter Root with Clark's Fork, or Flathead river. There seems to be no inducement for them to navigate it, as their hunting grounds lie in another direction, and they are too indolent to explore a new route, if not absolutely necessary. At last a skin canoe was made of three bullocks' hides stretched over a frame, and on October 15 he embarked with two white men and an Indian as crew. No one knew anything as to the character of the river ahead of them, and it was necessary, therefore, to proceed with caution. It was found quite shallow in many places, and the canoe which, when loaded, drew only ten inches of water, had frequently to be lightened until he passed the Hell-Gate. About sixty miles below the mouth of the Hell-Gate the mountains, crowding close upon it, make it very rapid, but further down it is more straight, deeper, and sluggish, with large flats on one or both sides of it.

From the Horse Plain down Clark's Fork to St. Ignatius' mission, where he arrived on November 8, he had to make two portages. The Hudson Bay Company were formerly in the habit of carrying up their goods in large boats to Horse Plain from the foot of Pend d'Oreille lake, making two portages on the way. Below the lake there is no obstruction for about thirty

miles, when a fall of six and a half feet is met with, the river being divided by rocky islands. From this fall to a point nine miles above the lake he is of opinion that steamboats drawing from twenty to twenty-four inches could easily ascend, and in high water the distance might be increased from sixty to a hundred miles, or from a point ten miles below the Mission to the "Cabinet," fifteen miles above the lake. A lock might readily be constructed at the falls so as to admit of navigation at all seasons. At the Cabinet the river is compressed between walls of solid rock, about a hundred feet in height, and becomes very narrow and rapid, as at the Dalles, so that the possibility of passing through with steamboats is uncertain.

The portage made by Dr. Suckley was of 1,300 paces.

From the uncertainty of the route before him Dr. Suckley was thus twenty-five days in reaching the Pend d'Oreille Mission of St. Ignatius. His provisions had become scanty, and after having devoured the last crumbs, made into a gruel with berries, they were glad to meet with a camp of Indians, not far above the Mission, who supplied them with food and treated them with great hospitality. The pious ceremonies of all these Indians, and their Christian deportment under the instructions of the missionary, Father Hoecken, were very interesting after their long and fatiguing journey, suffering from intense cold and half starved as they were. The missionaries themselves, Fathers Hoecken and Menetrie, with the lay brothers, Mageau and Francis, received them the next day with the kindest hospitality, and gave him much important information as to the country and its inhabitants.

Their industrious labors during the nine years since the Mission was established are shown in the fact that they have a large dwelling-house of hewn timber, a windmill, a blacksmith's and carpenter's shops, barns, cow-sheds, and a large church.

In this they had made and put up a carved and gilded altar, an image of the Virgin, brazen crosses, and rich bronzed fonts, all made by laborious industry with tools imported from Europe. They had made, also, a grindstone, blacksmith's bellows, ploughshares, bricks, &c.; they manufacture their own soap, candles, and vinegar. All the buildings are of hewn timber, except those for the cattle, which are of logs. The farm consists of 160 acres of cleared land, on which they raise wheat, barley, onions, cabbages, parsnips, peas, beets, potatoes, and carrots. They have also hogs and poultry, and make their own butter and cheese. Around their house are those of the Indians, also of hewn timber, sixteen in number, and several huts of mats and skins, this being the headquarters of the tribe, where they prefer to live and die rather than to move to other tracts higher up, where the priests wished them to go on account of the superiority of the land. Their condition has been vastly improved since the arrival of the missionaries, before which it required their utmost exertions to provide for a subsistence.

His canoe being now so rotten that, to continue down the river, he must make or buy a new one, and from receiving the false information that I had sent positive orders to him to go by land from the Mission to Fort Colville, he reluctantly left on horseback, November 10, and reached the fort on the 13th.

He supposed, from what he could gather, that he might have descended the river, proceeding cautiously and making portages, though the Indians were not in the habit of going by that route. After a rest of four days in the pleasant society of Mr. Macdonald and the missionaries, he again embarked below Kettle Falls with two canoes and three Indians, and travelling about three and a half miles an hour reached Vancouver on the 6th of December. The only portage of consequence made in this part of the river was at the Dalles, of 800 paces. At the Cascades he transported his canoes by the usual route over the wooden railway. Just

below the mouth of the Spokane there are a number of rock islands scattered through the river, and others occur at several other points on the river, affording an excellent support for the arches of a bridge.

Dr. Suckley also collected much valuable information concerning the manners and customs of the Indians; the habits of the salmon, which supply them with such a large share of their subsistence; the kinds and amount of game and other animals; and procured some interesting specimens of natural history and geology, in spite of the numerous disadvantages he labored under, in exploring an almost unknown river at so late and inclement a season.

The whole time, including stoppages, was fifty-three days, two less than had been occupied by Lieutenant Donelson and the main train in the land journey. The actual travelling time was $285\frac{1}{2}$ hours, and the approximate distance along the windings of the river 1,049 miles, allowing an average speed of $3\frac{674}{1000}$ miles an hour.

The incidents of this trip and the season of the year show the force of character and sagacity of Dr. Suckley. Before he left the survey he received his appointment as assistant surgeon in the army, and was stationed for some years on Puget Sound, and at the Dalles of the Columbia. His contributions to the natural history of this route, and especially that of the country west of the Cascades, have been very considerable; but his services in war and peace reflected equal credit upon his high qualities, and fulfilled the promises which had been given by his services on the exploration, and especially his trip down Clark's Fork and the main Columbia. During this time we were all occupied in preparing the reports of the exploration for the War Department. On the 31st of January an express messenger from Mr. Tinkham, the Sapper Wilson, reached me, informing me of his arrival at Walla-Walla, and of his having started to execute my instructions to cross over to the sound by the Snoqualme Pass; but he had concluded finally to go on foot, accompanied simply by Indian guides. This information was to me highly satisfactory; and, from Mr. Tinkham's known energy of character, I believed he would complete the exploration in this quarter. Captain McClellan's verbal narrative of his trip we reduced to writing. It is in substance as follows:

CAPTAIN McCLELLAN'S TRIP TO BELLINGHAM BAY.

On December 23d Captain McClellan left Olympia in a canoe with Mr. Minter and a small party, intending to make an examination of the Yakima passes from the west side, going by land from Steilacoom, but on arriving there he found it impossible to obtain land transportation, the Indians representing the road as impracticable at this season. He therefore resolved to proceed to the falls of the Snoqualme river in canoes, and thence on foot as far as possible. Proceeding from Steilacoom down the sound, he reached the mouth of the Sinahomish, distant sixty-five miles, on January 1, and, going up that river and its south branch, the Snoqualme, reached the falls on the 7th.

No Indian could be persuaded to guide him further. The trail was entirely obliterated, and he therefore proceeded only a few miles further on foot. From the information obtained, there appeared to be no possibility of proceeding further than Lake Nooknoo, and as the barometer he had with him proved worthless, he concluded that no object would be gained by continuing onward which would compensate for the difficulties to be overcome.

The Indians represented the snow to be up to the armpits at Lake Nooknoo, and as increasing in depth thence to the pass, at the summit of which it would be found twenty-five feet in depth.

The Sinahomish is navigable for small steamers for about twelve miles. It forks six miles

further, the "Skywhamish," or north fork, being the larger of the two. The falls of the Snoqualme are estimated at nearly 150 feet in height, and are exceedingly beautiful. Similar falls exist at the foot of Lake Nooknoo, on the Skywhamish, the Stoluckwhamish, and the Skagit.

Captain McClellan intended then to continue the journey down the sound to Bellingham Bay, but on arriving at McDonough's island, on January 12th, a severe snow storm came on, with a gale, which prevented further progress. On the 14th he therefore turned back, and reached Olympia on January 21, having been on the sound during the coldest period of the winter.

MR. TINKHAM'S EXPLORATIONS FROM THE JOCKO RIVER TO SEATTLE.

Somewhat unexpectedly, but to our great delight, Mr. Tinkham arrived this evening at Olympia, having crossed the Snoqualme Pass on the 20th day of January, and finding but six feet of snow for a short distance. Here we had the actual depth of the snow as determined by admeasurement, as well as the judgment of one of the most intelligent and able officers I ever knew, as to its depth, derived from Indian reports and statements; for, previously to the arrival of Tinkham, I had received Captain McClellan's report as to the probable depth of snow on that pass. In the one case the depth was six feet, and in the other case it was reported to be twenty feet or more. Mr. Tinkham's performance of his duty, from the time he left my camp on the Bitter Root, on the 7th day of October, to the date of his arrival in Olympia, was one of great hardihood, vigor, and endurance. During this time he traversed — miles of country, of which — miles were on foot. The animals which he sent back from the snows of the Bitter Root to Fort Owen arrived safely in charge of Pearson and French, excepting four. This I had the satisfaction to learn some weeks afterward in a report from Lieutenant Mullan. I will now give a brief account of this extended line of exploration by Mr. Tinkham.

Mr. Tinkham left the last camping ground made by Lieutenant Donelson with the main train on Jocko river, and travelling westwardly, followed Jocko river to its mouth; and then proceeded up the valley of the Flathead river, which he found to be wide and bordered by partially wooded hills nearly to the lake. It is a fine, clear stream, one hundred to one hundred and fifty yards in width, occasionally fordable, and with a swift current, estimated to have a descent of about ten feet per mile.

Passing around the western shore of the lake among woody and rocky hills, at the foot of the lake is a small green prairie of good soil mingled with fragments of trap rock.

At the upper end of the lake lies an extensive prairie, which is twenty miles in width, and extends far north of where he left it to ascend the mountains.

Following up the most eastern fork of the stream which supplies the lake, he came to the wooded mountains twenty-eight miles from the lake, closing in on the valley of the branch he followed. Then, again dividing, they leave a nearly level but wooded basin for fourteen miles, where the river forks, the trail following the northern tributary. This now becomes walled in by lofty precipices, with gray, naked peaks, rising in bold relief from the dark forests below them. The valley is narrow and wooded, the trail laborious and difficult, and grass scarce west of the summit. A bare, rocky, curving ridge heads the valley over which the trail winds, often only wide enough for the path of a horse, and quite impracticable for wagons. It is 2,150 feet higher than the valley, and 7,600 above the sea.

He passed this summit on the 20th of October, and, although up to this time there had been fine, clear autumnal weather, as he rose in the valley frost and ice occurred, and while crossing

there was a snow storm, which continued till the next day, with severe cold weather, on the way to Fort Benton the thermometer reaching as low as 3° above 0. The contrast in the growth of the trees on the west and east sides of the mountains was remarkable. On the west they continued large and thrifty almost to the summit, but on the east, what little growth there was, was of short scrubby pines.

Mr. Tinkham, leaving Fort Benton on the 31st of October, 1853, forded the Missouri a short distance below the fort, where it was about six hundred feet wide and three feet deep. Thence he travelled up near its south bank, kept at some distance to avoid the deep coulees, for fifty-eight miles, passing by the Great Falls. Above these the country improves in appearance, is less broken with coulees, and not bordered by the steep bluffs as below. The soil and grass are better, and the river banks more wooded.

Belt Mountain creek where crossed was eighty feet wide, and so deep that a ford was found with difficulty.

He considered the road much better on the north and west side of the Missouri. Here he was compelled to ford the Missouri by almost impassable rocky bluffs coming down to the river, and then continued up the west bank from Dearborn river to Prickley Pear creek, where he struck upon Lieutenant Mullan's route, as just described. The country becomes gradually more hilly, though perfectly practicable for wagons to the Little Blackfoot Pass, at the head of the last mentioned stream. He was little troubled either with snow or cold after getting within forty miles of the summit, the thermometer never ranging below 20° above zero, and generally much higher. On the 16th of November, he passed over in company with a large troop of Pend d'Oreille Indians returning from the buffalo hunt. The dividing ridge is a mere hill, up which, on the eastern side, loaded wagons can be drawn without serious difficulty; and the descent on the western side is, for a wagon road, all that is desirable. An inch or two of snow lay on the eastern side of this hill.

Following down the valley of the Little Blackfoot and Hell-Gate rivers, he found them unusually favorable either for a wagon or railroad route. It has an average descent of about twenty-two and a half feet per mile, and the valley generally wider than that of the Big Blackfoot, as well as less obstructed by trees, so that a small amount of labor could make it an excellent wagon road. Most of it is also desirable for settlement, and he did not consider the distance essentially increased over that by Cadotte's Pass. On the 17th he reached Cantonment Stevens, and was delighted with the Bitter Root valley.

Again starting out, on the 20th, with a fresh band of horses and provisions, he went up to the head of the valley, and left it to cross the Bitter Root range by the southern Nez Percé's trail. The route explored is described as follows:

The southwest fork of the St. Mary's (Bitter Root) is a short distance above its union with the main stream, above eighty feet wide, three feet deep, with a bottom of large round stones of granite or gneiss. The valley is narrow, closed in by high wooded hills, and the trail leaves it near its end, a distance of twenty-four miles. The horse trail is narrow, and is not practicable for wagons. Snow appeared soon after leaving the valley of the Bitter Root, and was finally about eight inches deep, and the streams were half frozen.

After leaving this valley the trail passes over a high and hilly ridge to the Kooskooskia. It is steep and laborious, wholly impracticable for wagons. It was rendered more difficult by the snow, which covered the summit to the depth of three feet, and made the crossing a journey of three days, though only fifteen miles.

Directly across is not more than five miles, but the trail avoids the stream and follows the steep grassy slopes and ridges north of it, being less obstructed with timber, and it is probably usual to make the crossing in one day.

The trail here crosses the head waters of the Kooskooskia, which is sixty or eighty feet broad, with a pebbly bottom, and flows in a deep, gorge-like valley, wooded with pines, fir, spruce, cedar, hemlock, &c. Again, ascending the high hills on the opposite side, he was brought to a halt on the 27th November by snow four feet deep, with a steep hill before him, up which it was impossible to make their way. Here he remained reconnoitering and endeavoring to break a trail for the animals, but as two feet of snow fell in addition, and afterwards a rain, he determined to send the animals back to the St. Mary's valley, while he and the rest of the party pushed on. Accordingly, his party spent here a week engaged in making snow shoes, when each one, taking a pack upon his back, proceeded through the snow towards the Nez Percé's country.

For eighty-nine miles further the trail led over the summits of high and very rugged hills, covered at their tops with deep snow, and evidently forming the dividing ridge between the Kooskooskia and a more southern branch of the Snake, as streams flowed from among them both to the north and the south. This course is, as usual with the Indians in travelling through a wooded country, selected to save themselves the labor of cutting a road through the wooded valleys. As they journey on horseback, and have no regard for the labor performed by their horses, this becomes their favorite plan, while white men would prefer to clear a way up the valley; the want of grass for their horses in the valley may be another reason for following the ridges.

The little streams crossed, though mere brooks, each had a valley sometimes a quarter of a mile wide, flat and grassy, which must of course expand further down their course; and on the Kooskooskia, which was left many miles to the north, a valley approaching to that of the Bitter Root may be expected, probably more thickly wooded, and perhaps interrupted by narrow defiles through some of the ridges which cross its course.

On December 17, after fifteen days of laborious travel, his little party emerged into the unwooded valley of the Clearwater, a few miles above its junction with the Kooskooskia, where they met with a party of the Nez Percés Indians, and remained with them nearly a week. Their horses and cattle, with some young calves, were grazing in the valley, where the grass was bright and green; and young pea-vines were several inches high, the whole valley being strongly contrasted with the mountains he had just passed over. A slight fall of snow occurred while he was there.

Going on westward, he reached Walla-Walla December 30. The country appeared to contain much excellent land along this part of the route which lay south of the Snake river which he crossed at the mouth of the Kooskooskia. The corn and wheat raised by the Indians was of good quality; and Mr. Craig, who has a farm at Layswai, on the Kooskooskia, about forty-five miles from the mountains, raises also peas, squashes, onions, potatoes, melons, &c.

Similar fine valleys exist on the Tucanon, Touchet, and smaller streams running in on the south side of the Snake. The weather continued mild up to the time he reached Walla-Walla.

The day after his arrival he received my instructions directing him to proceed to the sound by way of the Snoqualme Pass, and though just after his severe hardships in the Bitter Root range, he immediately made preparations to carry them out. He reached Olympia on February 1, after a journey of twenty-four days, and thus gives the result of his observations:

On the 7th of January, with two Walla-Walla Indians, he proceeded up the Columbia till it receives the waters of the Yakima river, and then, taking the latter stream, turned westwardly to trace its waters to their source in the close vicinity of the waters flowing into Puget Sound. Passing over the intermediate portion of the route, on the 17th January he arrived within three or four miles of the Kle-al-um lake, the source of one of the principal forks of the Yakima river. To this point he had travelled without difficulty with horses, and here commenced the most laborious part of the exploration. The snow was now about two feet deep, and the weather for several days had been intensely cold, although not colder than is experienced in all our northern States at this season. No grass could be obtained near here, and the few Indians residing in the vicinity of the lake were without animals; but thirty miles lower down the river the snow was very light, not over three or four inches deep. The grass was good and exposed, and the Indian horses were in good condition.

Although, with the disadvantages under which he was placed, he was satisfied that it afforded fair facilities both in ascent and descent for a wagon and railroad, either with the use of eighty feet grades for a limited number of miles and a short tunnel, or with a longer tunnel and easier grades.

Wishing to know the real difficulty to be apprehended from the passage of these mountains in the winter season by railroad trains, he paid particular attention to the measurement and examination of the snows on the route. From Kitchelus lake to the summit, some five miles, and where occurs the deepest snow, the average measurement was about six feet, but frequently running as high as seven feet.

In a storm occurring on the night of the 20th about one and a half feet of this depth was deposited—a very light, dry snow. The whole of the snow was very light and dry, deposited in successive layers from one to two feet thick, and for the greater part of the route had lain undisturbed since its fall, every twig and bush bowing under their heavy burden. These snows present little obstruction to removal in comparison with the compact, drifted snow of the Atlantic States, and would cause very little detention to the passage of trains. Passing on to the west side of the Cascades the snow rapidly disappears; fourteen miles from the summit there were but eight inches of snow, and thence it gradually faded away as approach is made to the shores of the sound. For only a few miles was the snow six feet deep; the whole breadth over twelve inches deep was somewhat less than sixty miles in extent. Of this, forty-five miles were two feet deep and upwards, about twenty miles were four feet deep and upwards, and six miles were six feet deep.

In descending the western slope of the Yakima Pass, Mr. Tinkham judged that the natural descent of the valley of the Nooknoo was sixty feet per mile, and that it soon became less than this. He thinks that from this point westward no serious difficulty exists, and the balance of the road to Seattle may be made without objectionable grades as work of an unusually expensive character.

About seventeen miles from the summit the Nooknoo (Nooksai-nooksai) empties into the lake of the same name, and about four miles long, the valley for this distance being densely wooded. Here the trail followed by Mr. Tinkham then left this river, (which below is called Cedar river, and empties into Dwamish lake,) and crossing a nearly level tract of woods for five miles entered upon "Rangers' Prairie," a large and rich one, just above the falls of the Snoqualme. It is estimated that there are 10,000 acres of excellent prairie land in the vicinity of these falls, both above and below, and the falls themselves are 280 feet high. Going down the river for nine

miles, Mr. Tinkham left it, and by a very circuitous route, forty miles long, reached Seattle, January 26, seven days after leaving the eastern base of the dividing ridge.

I had not mentioned in the proper place that when I parted with Garry, the Spokane chief, at Vancouver, (for he was, also, the guest there of Colonel Bonneville,) I made arrangements for him to express letters to Lieutenant Mullan, at Fort Owen, and in return to bring me news of the operations of his party; and again, in January, I also despatched Higgins, who had been our wagon and packmaster, with an express to the same point. I had another object in pushing forward those expresses, which was to determine the depth of snow, from time to time, through the winter along the line of Clark's Fork, and thence to Cantonment Stevens, in the Bitter Root valley. On the 6th of March Garry reached Olympia, with Lieutenant Mullan's report of his trip to the waters of the Missouri in October and November, and of his trip to Fort Hall and back in November and January. These trips caused him and his little party to travel — miles, and to cross the divide of the Rocky mountains six times—three crossings having been made in the month of December and one in the month of January.

LIEUTENANT MULLAN'S EXPLORATIONS SOUTH OF THE BLACKFOOT RIVER.

The country south of the Blackfoot river, and between the Rocky mountains and Bitter Root river, was thoroughly explored by Lieutenant Mullan in 1853 and 1854. In the latter part of October he ascended the Bitter Root to its sources, and crossed the dividing ridge to Wisdom and Jefferson rivers; and, returning to Cantonment Stevens, he again travelled over the same route between the 28th of November and 13th of December, when he reached Fort Hall, on Snake river. Bitter Root, or St. Mary's valley, is about eighty miles long from north to south, and from four to seven wide; well adapted for agriculture, the soil being a rich, dark loam, mingled with sand and gravel, in which wheat, oats and potatoes have been found to grow exceedingly well, and is naturally covered with luxuriant grass, supplying inexhaustible pasture, in which already several thousand cattle and horses were roaming and were scarcely noticed in the vast area. It has been noted, that when other valleys of the mountains are covered with snow, in this valley perpetual spring is found to reign during the whole of nearly every year. At that time (November) the mountains on each side were covered with snow from base to summit, though no traces of snow were to be met with in the valley.

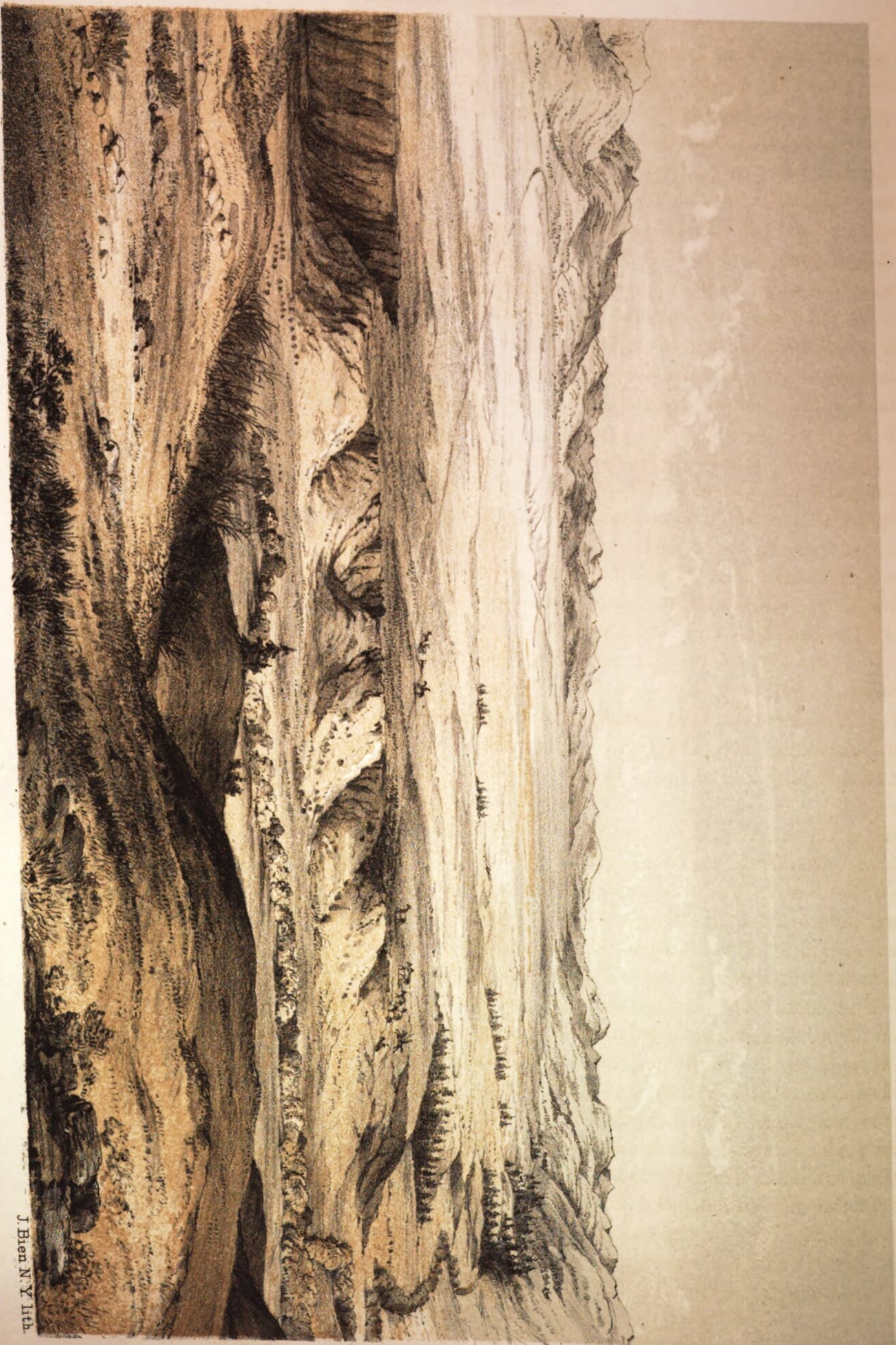
The river banks are lined with cotton-wood sixty or seventy feet high, and pines much larger and superior than elsewhere found, sometimes a hundred and fifty feet high and perfectly straight, with a diameter of three feet. At the forks where the prairie ends, he followed the southeast branch for twenty miles, and passing over a mountain a thousand feet high, having about two inches depth of snow on its summit, reached Ross' Hole prairie on the 3d of December. He describes this prairie as being fourteen miles long and four wide, where the grass was six inches long and quite green. A wagon road passes round the mountain leading to this prairie, and crosses it, traversing the dividing ridge of the Rocky mountains, about twelve miles north of his route. The weather still continued mild and pleasant, with showers of rain. Two branches of the Bitter Root river flow through the prairie, having their sources about four miles further east in the range of mountains forming the dividing ridge between the Missouri and Columbia rivers. This portion of the Rocky mountains is made up of ridges of mountains and patches of prairie, varying from 10 to 30 miles in length, and as many in width. Ascending the dividing ridge here, called "Big Hole mountain," he found its western slope perfectly clear of snow, affording a very excellent road, though up a very steep ascent. On

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BIG HOLE PRAIRIE FROM THE NORTH.

its summit snow was a foot deep, the thermometer falling from 47° at the base, to 36° at the summit, which he estimated to be three thousand feet high. The western slope he considered practicable for the ascent of empty wagons, and very good for the descent of full ones.

The descent towards the Missouri side is very gradual, so much so, that were it not for the direction taken by the water it might be considered an almost level prairie country. This mountain, which is of granite formation, is covered with "white pine," growing from fifty to seventy feet high. Here striking upon a branch of Wisdom river, a tributary of the Jefferson Fork of the Missouri, which he followed down through a well timbered valley about two miles wide, occasionally forming prairies from six to twelve miles long, and three or four wide.

From his camp on this stream, of December 4, he had a fine view of Big Hole prairie, which is about fifty miles long and fifteen wide. Crossing this on the following day, (December 5,) its western side was found to be covered with snow some six inches deep, though none appeared on its eastern. It is hemmed in by high mountains on every side except the southeast, where Wisdom river passes out from it.

South of this large and beautiful prairie he crossed a ridge separating it from the valley of Jefferson Fork, by an excellent wagon road. The country now became more rough and barren, no trees except the pines on the summits of the mountains and an occasional cottonwood. *Artemisia*, or "wild sage," with a trunk a foot in diameter, became the only fuel. The weather became much colder, the thermometer, on December 6, being as low as 12° , and the streams were frozen so hard as to be crossed without difficulty. Narrow valleys, with fine grass, lined the branches of Jefferson Fork, but there was no timber on the river banks at less than a distance of twenty miles between the groves, and willow bushes grow only five or six feet high.

Following up the southwest branch of Jefferson's river, called "Red Butte creek" from the color of the hills around, he found no vegetation but *artemisia*, and on the south side of some of the hills, a few stunted pines and cedars. The road was, however, very level and good, until leaving the valley it passed for six miles through a cañon, and twenty-eight miles further reached the foot of the dividing ridge between the Jefferson Fork of the Missouri and the Lewis Fork, or Snake river, of the Columbia, where there was a little good grass and wood. He again crossed the Rocky mountain ridge on December 9. The ascent was quite steep and covered with snow a foot deep; in some places drifted to three feet, so that the animals got through with much difficulty. The air on top was exceedingly cold, and the southwest wind blew clouds of snow in their faces. The descent was even more steep than the ascent, compelling them to dismount and travel on foot. At the base of the dividing ridge the course for several miles lay through a winding gorge to the source of the Medicine Lodge creek, which for fifteen miles has a very pretty valley, but without grass or any wood, except willow. Numbers of mountain sheep were seen on the rugged mountains around, but no other game occurred after leaving the Bitter Root valley. Crossing over the summit of a low ridge, by a rough and rugged road, he came upon an immense sage prairie about twenty miles in width, extending as far south as Snake river; travelling across which, he again came to the Medicine Lodge creek, which he crossed and proceeded sixteen miles further to a stream known as Kamas Prairie creek.

Sixteen miles from the Kamas Prairie creek he came in view of a large lake, which he called "the Market lake," for the following reason: It would seem that in years past the bed of this lake was an immense prairie bottom or basin, and a favorite resort for game of all kinds, even,

indeed, the buffalo, that have been killed in and near it in large numbers, and the evidences of which were shown by the skulls of the animals from near the present border of the lake.

So abundant, indeed, was the game here that the trappers and mountain-men of that day, who in squads and bands trapped and hunted in this wilderness of mountains, always said to each other when their supply of subsistence grew scanty, "let us go to the market," referring to this resort of the herds of game, and they never visited it in vain until, by one of those strange freaks of nature in this valley of the Snake river, which is fed at many points throughout its length by subterranean streams, this market was converted into an immense sheet of water. It is only accounted for by supposing that the streams making down from the Snake River mountains, and losing themselves in the sand or sage desert of the valley, break forth at or near the latter, which is thus fed from year to year by the meltings of the snows and the rains from these mountains. In order, therefore, to retain and hand down the name of this once favorite resort, and the legend connected with it, Lieutenant Mullan named this sheet of water "the Market lake."

Travelling along the banks of this lake for eight miles, he left it and, in a short time, fell upon the main stream of Snake river, which was from one hundred and fifty to two hundred yards wide, and very deep, with high clay banks on either side, and bordered with a slight growth of willow.

He travelled down this river forty miles further, through a similar desert, on the right or west bank, until within five miles of Cantonment Loring, entering a beautiful prairie, with excellent grass and many streams, which continues five miles further to Fort Hall, where he arrived December 13.

On December 19 Lieutenant Mullan started on his return from Fort Hall northward, over the same route for twenty miles north of where he had struck Snake river, then more to the east, up High Bank creek, which he followed to the base of the mountains, finding no snow until then, when it was three inches deep on December 23. The streams were all frozen hard, and there was no game; grass and wood were also very scarce.

On the 24th he encountered a snow storm, the snow falling to the depth of six inches. The thermometer at sunrise was at 3° and only 22° at noon. High up the cañon of this creek there was some cedar, spruce, and aspen, but no timber on the mountains. This cañon is travelled by wagons from Fort Hall to the Bitter Root; for the first time, in 1840, by Father de Smet. At nine miles from this stream he struck upon the waters of "Hooked Man's" creek, a branch of Jefferson Fork, crossing a low ridge with a very gradual slope. There was snow on the summit a foot deep, and in the morning the thermometer was as low as 14° below zero, and ice twenty inches thick on the streams. But, reaching the valley of Jefferson Fork, the snow was only six inches deep, and the animals obtained good grass under it. As he approached Jefferson Fork the snow and ice disappeared, and the weather became so mild as to make fires scarcely necessary. Another beautiful prairie appeared here, twenty-five miles east of Big Hole prairie, before described, and, like it, surrounded by mountains. It was fifteen miles wide, and through it ran the Jefferson Fork, bordered with cotton-wood, while the prairie, covered with grass, looked like a great field of yellow grain. Game was here exceedingly abundant, large bands of deer and antelope being seen; and this is a favorite hunting ground of the Indians, the mountains in the vicinity being filled with large numbers of bears, moose, and elk. The Jefferson Fork was here fifty yards wide and two feet deep at the fork.

Lieutenant Mullan found a beautiful country towards the head of the Missouri, not far from

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HOT SPRING MOUND, IN THE "DEER LODGE" PRAIRIE, OF THE ROCKY MOUNTAINS.



Stanley del.

CROSSING THE HELLGATE RIVER. JAN. 6th. 1854.

the three forks; beautiful and extensive well grassed valleys that extended far towards the east in the direction of the Yellowstone, and which his guide told him retained the same general character to near the Black hills of Nebraska.

Well wooded streams, fertile bottoms, mild climate, even late in December, and uncounted herds of game grazing at every point, all tended to form a picture for which he was not prepared, and that showed the capability of the country in the most marked manner.

Near the Jefferson Fork the wooded mountains now gave place to low ranges of rolling prairie hills that lost themselves in the swelling prairies that constitute the great plains of the Missouri and Yellowstone, upon which graze the countless herds of buffalo, and, as he truly says, "with this region free from snow, the country looked not unlike fields of yellow grain all ready for the reaper's hook."

Passing up a branch of the Jefferson river towards the north, he again reached Wisdom river, about fifty miles east of where he crossed it in going south through Big Hole prairie, and found it here a bold stream, seventy-five yards wide, and timbered with cotton-wood in abundance fifty or sixty feet high. Its valley is five miles wide, bounded on each side by high ranges of pine-clad mountains, but the soil poor, producing chiefly artemisia and cactus. Following up the river for about twenty miles, through a fine open valley, he left it, and followed up the valley of a small willow run, affording an excellent road, the valley being from a mile to a mile and a half wide. At the head of the stream he crossed "low clay ridges, the latter of which formed the dividing ridge between the waters of Wisdom river and Hell-Gate Fork." On the summit there was snow two inches deep, though none in the valley below. Thus on the last day of December, 1853, he again reached the waters of the Columbia by a pass nearly 70 miles east of where he left them on the fourth preceding. Descending a branch of Hell-Gate river on the first of January, 1854, Lieutenant Mullan entered the long, level, and beautiful prairie called the "Deer Lodge," from the great numbers of deer found about it. It resembles that of Bitter Root valley, but is more extensive, being about fifty miles long and twelve to fifteen wide, bounded on all sides, except the southeast, by high wooded mountains, of which the summits only were covered with snow. Like that, too, it is noted for the slight fall of snow in it during the severest winters, and its many streams are lined with timber. Large numbers of antelope were feeding in it, and mountain sheep and goats were seen on the peaks around. Near its centre is a conical mound, about thirty feet high, around the base of which are innumerable springs of hot water, and on top a spring three feet in diameter, down which was thrust a pole twenty feet long without finding bottom. The water from this does not run over the top. A white soft salt is deposited around it.

After crossing "Deer Lodge" prairie he followed down the Hell-Gate river to its junction with the Bitter Root, and reached Fort Owen on the 10th of January. After the 3d there was a great change in the weather, accompanied by snow, and the streams became frozen over, though not hard enough to bear his animal's weight, and it was therefore not so cold as it had been on Jefferson's Fork. His thermometer having been broken, the exact temperature could not be determined.

Thus, in a journey of forty-five days, he had crossed the mountains four times, at our different passes, and traversed two sections of country differing in soil, productions, natural features, and general character. In the Hell-Gate valley snow was from four to six inches deep, but in the Bitter Root there was none at all, and it seemed as if he had entered an entirely different region and climate. Garry had pushed the express up Clark's Fork in

December, where he arrived early in January. The greatest depth of snow found in the latter part of December and early in January on the route was one foot. Lieutenant Mullan's letter is dated the 12th of January, at which time the Indian started on his return, passing down Charles' Fork from about the 15th to the 25th of January. The greatest depth of snow on the entire route was then a foot and a half.

In regard to Higgins, he went up Clark's Fork in the month of March, finding no difficulty in moving along with horses, having taken the precaution to supply himself with forage, and there was no difficulty whatever on his return trip.

On the 25th of March I had made my arrangements to leave the next day with my report for the city of Washington, when early that day Lieutenant Grover arrived, having triumphantly carried out his enterprise of passing over all the ranges in the winter, from the waters of the Missouri to the lower Columbia. The following is the substance of his operations from the date of my parting from him at Fort Benton to our meeting to-day.

LIEUTENANT GROVER'S EXPLORATIONS FROM THE MISSOURI TO THE LOWER COLUMBIA.

The Great Falls of the Missouri are situated about 75 miles by land above the fort.

There are five principal cascades; the first of twenty-five feet fall, about three miles below the mouth of Sun river; the second nearly three miles below this, of five feet eleven inches; and immediately below it the third. Here, between high banks, a ledge, nearly as straight as if formed by art, runs obliquely across the river and over it the waters fall forty-two feet in one continuous sheet of four hundred and seventy yards in width. Half a mile below this is the fourth, a small irregular cascade of about twelve feet descent. The stream then hurries on, lashed and churned by numerous rapids, about five miles further, when it precipitates itself over a precipice seventy-six feet high. The banks are high and abrupt on both sides, with deep ravines extending into the prairie for one or two miles both above and below it. Below the falls there is a continuation of rapids, which become less and less frequent, to the mouth of Highwood creek. Steep banks about two hundred feet high crowd closely upon the river, and on the north side are so cut up by precipitous ravines that it is almost impossible to keep near it. But from this to Fort Benton the river bends are longer and there are patches of bottom lands. The soil is good and grass plentiful both on the bottoms and the adjacent high prairies. There is a good supply of cotton-wood, and on the Highwood mountains pine timber is easy of access, this being the place where the Fur Company get their building materials. Below the mouth of the Highwood there are no rapids of any consequence to Fort Benton, and the river and its banks much resemble that portion of the stream below the fort.

The Missouri, from the Great Falls to the mouth of Milk river, was surveyed by Lieutenant Grover, travelling in a flat-boat. For many miles below the falls the river flows at the bottom of a cañon, with very abrupt and bare walls, between which it winds, leaving at each detour a small rich interval in the bend covered with luxuriant grass and sometimes skirted by a few small cotton-wood trees.

The cliffs are from one hundred to one hundred and sixty feet high, and the interval between.

Passing through the bluffs of the Bear's Paw range, the scenery assumed an entirely new phase. The bluffs were more abrupt and crowded on the river; colonnades and detached pillars of partially cemented sand, capped by huge globes of light brownish sandstone, towered up from their steep sides to the height of a hundred feet or more above the water. The action of the weather upon the bluffs in the back-ground has worn them into a thousand grotesque

forms, while lower down their faces seams of rock from three to six feet thick, with a nearly vertical dip, beaten and cracked by the weather, and still protruding for six or eight feet above the softer materials, run up the steep faces and projecting shoulders of the cliffs, looking exactly like stone walls. At a little distance the resemblance to old ruins is striking.

Among these is "Citadel Rock," a vertical shaft of volcanic (?) formation, rising about two hundred feet above the water's edge and standing upon a base of about forty feet square. By climbing up a goat-path he succeeded in getting on top of one of the globes that rested on a short pillar, and in passing from that to some of the others near it. All were nearly of the same size—between six and eight feet in diameter—and, as far as the eye could detect, were as perfectly round as if they had been turned.

At the foot of the bluffs, and in the small brooks near by, were traces of lignite, and glauber salt had collected by efflorescence on the surface.

Near Arrow and Dog rivers the bluffs recede from the river, leaving wide grazing meadows scattered with cotton-wood. An extensive bottom is formed at the confluence of Judith and Dog rivers, which is well wooded.

Below this point the "Mauvaises Terres" border the river for about twenty miles, presenting "a picture of nature's wild deformities," a masterpiece in its way, characterized by a total absence of anything which could, by any possibility, give pleasure to the eye or gratification to the mind by any associations of utility. Not an island nor a shrub of any account; nothing but huge piles of bare mud towering up as high as they can stand and crowding each other for room. The banks varied in height from 200 to 300 feet for the whole distance. After passing this tract the country rapidly becomes more inhabitable. The bluffs are lower and more sloping, covered with grass; the bottom lands increase in width and richness of soil, fields of rank grass alternating with thick groves of cotton-wood, cherry, and willow.

The larger groves at this season are overrun by bands of elk and deer, which seek the protection of the thickets against the cold autumn storms.

There are a few scattering pines on the bluffs, and some short, scrubby red cedars.

From Fort Benton to the end of the "Mauvaises Terres" is 124 miles. The remainder of the distance to Milk river—228½ miles—the face of the country continues to improve, gradually approaching to the appearance of that below its mouth. This trip having been made in September, and at the lowest stage of the river, furnishes important data as to its navigability. For the first hundred miles numerous rapids occurred, only one of which was as shallow as 20 inches, known as "Dauphin's Rapid," some miles below the mouth of the Judith. The others were from 23 to 30 inches in depth, and the current on the shoalest was less than five miles an hour. Rocks carried down by ice also form obstructions in these shoals. Below these the only obstacles are sand-bars, snags, and sawyers, such as occur everywhere below.

Lieutenant Saxton, at the same period, made a voyage down the Missouri from Fort Benton to Fort Leavenworth. Leaving on the 22d, he reached the latter point in fifty days, having travelled from below St. Joseph's in a steamer. The keel-boat in which he went was fully loaded, and drew eighteen inches. The distance to Fort Union, estimated at 750 miles by the river, was made in eleven days without the least difficulty.

Lieutenant Grover, after returning from his survey of the Missouri, remained at Fort Benton until January 2, 1854. Up to that time very little snow had fallen there, and it had covered the ground for only a few days at a time. The weather generally had been mild and uniform, and the stock of the Fur Company and of the expedition, without shelter or care, were in fine

condition. There had not even been snow enough yet for him to make use of the dog-sledges prepared for his journey across the mountains.

On the 2d he left the fort; and that evening it commenced snowing, and continued stormy for several days, during which about six inches of snow fell. On the 7th he continued on the way with dog-sledges, but, by the 9th, all the snow was gone and he was compelled to go over bare ground to near the base of the dividing ridge, where he again met with more permanent snow. This, on the summit, lay only a foot deep, and continued at the same level all the way across.

This was the commencement of the cold snow storm which overtook Lieutenant Mullan in Deer Lodge prairie. This snow, which was much less in depth on the east than on the west side of the mountains, melted off entirely before he reached Dearborn river, where another snow storm, on January 11, enabled him to reach Cadotte's Pass without difficulty, except from the piercing westerly winds increasing to a gale towards the foot of the dividing ridge. "It would appear that the prevailing high winds which blow through this pass are from the west; for, of the many thousand of dead pines that had been prostrated by them, not one did I see that was broken in any other direction than towards the east.

"The snow there was eight inches deep, and some of it appeared to have been on the ground some time. About an inch more fell on that night."

On January 12 he crossed the dividing ridge. "The ascent was steep and laborious, so much so that the men were obliged to double teams and make two turns from the base to the summit," though the distance was not over half a mile.

On the summit, at mid-day, the sun shone brightly in a cloudless sky, and was surrounded by a succession of beautiful halos, apparently produced by the refraction of his rays by "minute particles of frost so small as only to be visible in the sparkling of the sun," which filled the air.

The western slope of the ridge was not as abrupt as the eastern. The thermometer stood at 21° below zero, and the cold, assisted by a sharp west wind, froze their ears and noses. The snow was most of the way only a foot deep, and drifted but little.

Severe cold continued on the way down the Big Blackfoot, freezing the men's and dogs' feet severely; and on the 16th, "the coldest of the winter so far," the thermometer indicated 38° below zero, at sunrise. This intensely cold weather was not, however, disagreeable for traveling on foot, taking the precaution to rub the nose and ears frequently.

This was only about twenty-four miles from the sources of the stream, and consequently at a very elevated position. As far as the junction of the Hell-Gate and Bitter Root river, although snow fell on the 16th and 21st, it did not exceed eight inches in depth anywhere; and the imperfect freezing of the streams made the frequent crossings difficult, as the trail over the hills was entirely hidden. The weather, though pleasant otherwise, still continued from 10° to 20° below zero. After passing Hell-Gate defile the weather moderated, and the depth of snow decreased to six inches in Bitter Root valley, where he remained from the 22d to the 30th. On the 30th he left Fort Owen on the way westward. From Bitter Root valley to Thompson's Prairie, on Clark's Fork, he found no snow except what he saw on the mountain tops. The snow then gradually increased in depth for about fifty miles west, where it was about two feet deep on the average, and remained about this depth to Lake Pend d'Oreille, where it began to decrease, and at the lake was not over one foot in depth. Between this and Lake Cœur d'Aléne it was for most of the way two and a half feet deep, and very hard; but he left

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Stanley del

J. Bien N Y lith

BEARSTEETH. MISSOURI RIVER.
Gate of the Mountains.

it with the dense forest, and, reaching the plain, found the grass fine and the stock in nearly as fine condition as in the Flathead country.

With fresh horses he crossed to Walla-Walla in seven days, arriving on the 2d of March, and having no scarcity of grass at any point. The cause of the deep snow northward is shown by his statement that "the principal feature of the weather, since leaving the Flathead village, has been its dampness and storminess; scarcely a day passed during the whole time that was entirely pleasant." Pend d'Oreille lake was, however, only partially frozen over, with ice eight inches thick on one of its arms.

I repaired without delay to the city of Washington, leaving Olympia on the 26th of March.

Before I rendered my report which was sent in on the 20th of June, I received from Lieutenant Mullan an account of a trip from the Bitter Root valley to Fort Benton, in the month of March, which established the practicability of taking wagons over the mountains, and showed how small was the obstruction to be apprehended from snow.

LIEUTENANT MULLAN'S TRIP FROM THE BITTER ROOT TO FORT BENTON.

Lieutenant Mullan having learned from the Indians and half-breeds of the mountains the existence of a pass leading directly to Fort Benton, through which wagons could be carried with little or no difficulty, determined upon its examination, and if practicable, to test it by bringing wagons from Fort Benton to Bitter Root valley. With this view he started from Cantonment Stevens on the 2d of March for Fort Benton, following the Hell-Gate valley to its junction with that of the Little Blackfoot; thence along the left bank of the Missouri to the Gate of the Mountains, when he crossed the river on the ice, and following along its right bank, reached Fort Benton on the morning of the 12th. He found from twelve to fifteen inches of snow on the main divide of the Rocky mountains, little or no snow in the valleys or on either slope. He found the route until reaching the Gate practicable and easy, but here the road passed over a succession of difficult pine-clad hills that precluded the possibility of a wagon route, save at great expense. The character of the country and the views of the Indians all went to show an easier location to the north, which would turn this detached bed of mountains and reach the foot slope of the divide by easy grades and little or no work. Completing his preparations, he left Fort Benton on the morning of the 14th March, with a loaded wagon drawn by four mules, and keeping on the high plateau near the route of the expedition of the preceding year, found a level prairie road from Fort Benton to Sun river. Thence to the Dearborn, keeping some miles to the south of Donaldson's trail, the route was excellent. From this point, keeping some distance west of Tinkham's route, in fifteen miles he reached the valley of the Little Prickly Pear creek, which was half a mile wide, and well wooded. Up to this point he had met with no difficulty, but found an easy, practicable wagon road, a measured distance of 124 miles from Fort Benton. Here the fallen timber in the valley of the Little Prickly Pear creek was the first obstacle met with. Selecting a suitable camp on this creek for his party, he set his men to work clearing the timber for a track, which for a short distance followed the valley bottom; but finding, as he ascended the valley, the timber becoming somewhat more dense, which never has involved a greater amount of work and time in its removal than he had at his disposal, he preferred taking the southern slope of a hill, and, gaining the top of a high plateau, follow this through the longer of the two routes.

In fourteen miles, descending from this plateau, he reached the Prickly Pear creek a second time, which here flowed through a small prairie bottom. This creek rises in the main chain of

the Rocky mountains, and flows through two gaps or passes of two low parallel spurs that run northwest and southeast. By following the valley bottom of this creek you avoid all steep ascents and descents, and reach the foot slopes of the main range, the only work required being that of removing the timber and the building one or more small bridges over the Prickly Pear creek.

Gaining a high point of the river it was seen that for thirty miles above the Gate of the Mountains, from the point where the Missouri breaks through the belt range between the two Prickly Pear creeks, the country is "one immense bed of mountains, extending southward along the Missouri to its three forks for one hundred and fifty miles, and fifteen miles wide," making it necessary for a road to turn westward and northward of this range or bed. These mountains are mostly well wooded, with an abundant and large growth of pine, and the rock formation principally granite. In the preceding November Mr. Tinkham had very cold and snowy weather during his journey up this part of the river, but it did not continue, nor interfere with his crossing of the mountains. After the middle of March Lieutenant Mullan found no snow on any part of his route, and had beautiful weather on his return trip from Fort Benton. Even at this early day of the spring the grass in the bottoms was putting forth; and returning with the same animals that he had taken from Cantonment Stevens, they were fat and strong, and subsisting only upon the grass found at each night's camp. Wood, water, and grass throughout the whole distance, from Fort Benton to the foot of the divide, was found at suitable and convenient points, a measured line of 150 miles.

From the small Prickly Pear creek to the divide the country was an easily rolling prairie, with occasional strips of timber on either side. On the seventh night from Fort Benton, including the time occupied in the making of the road, he encamped at the foot of the mountains. On the morning of the eighth day he crossed the mountains with no difficulty whatever, found no snow upon its summit, and the divide itself nothing more than a low prairie hill. He says: "Indeed, the ascent and descent were so exceedingly gradual that not only was it not necessary to lock the wheels of the wagon in descending, but it was driven with the animals trotting."

"For a railroad line it would involve a cut of one hundred feet deep and half a mile long, which was the measured distance from base to base." He hardly imagined that he was on the waters of the Columbia until he recognized the distinctive and marked features of the valley of the Little Blackfoot. Leaving the divide, he followed down the broad and easy valleys of the Little Blackfoot and Hell-Gate to the junction of the latter with the Bitter Root, finding no difficulty along the whole line. All the streams being easily fordable at this season, and the forest being open, with little or no undergrowth, required but little work. For a good and permanent road, to be travelled at all seasons, the bridging of the Little Blackfoot and Hell-Gate would be required at all the present crossings.

In fourteen days from Fort Benton he reached Cantonment Stevens with his wagon—thus proving its complete practicability; and having measured the distance by an odometer, found his line only forty miles longer than that followed by Donelson, through Cadotte's Pass.

In view of the easy grade, the small amount of work required at first, put it in good condition for an emigrant line, and to maintain it in that condition, the abundance of grass, wood, and water, and its direct connexion with practicable lines to the east and west, he regards it the best route he examined in the mountain region.

Mr. Doty, in charge of a detached reconnoitring party, retracing Lieutenant Mullan's steps in



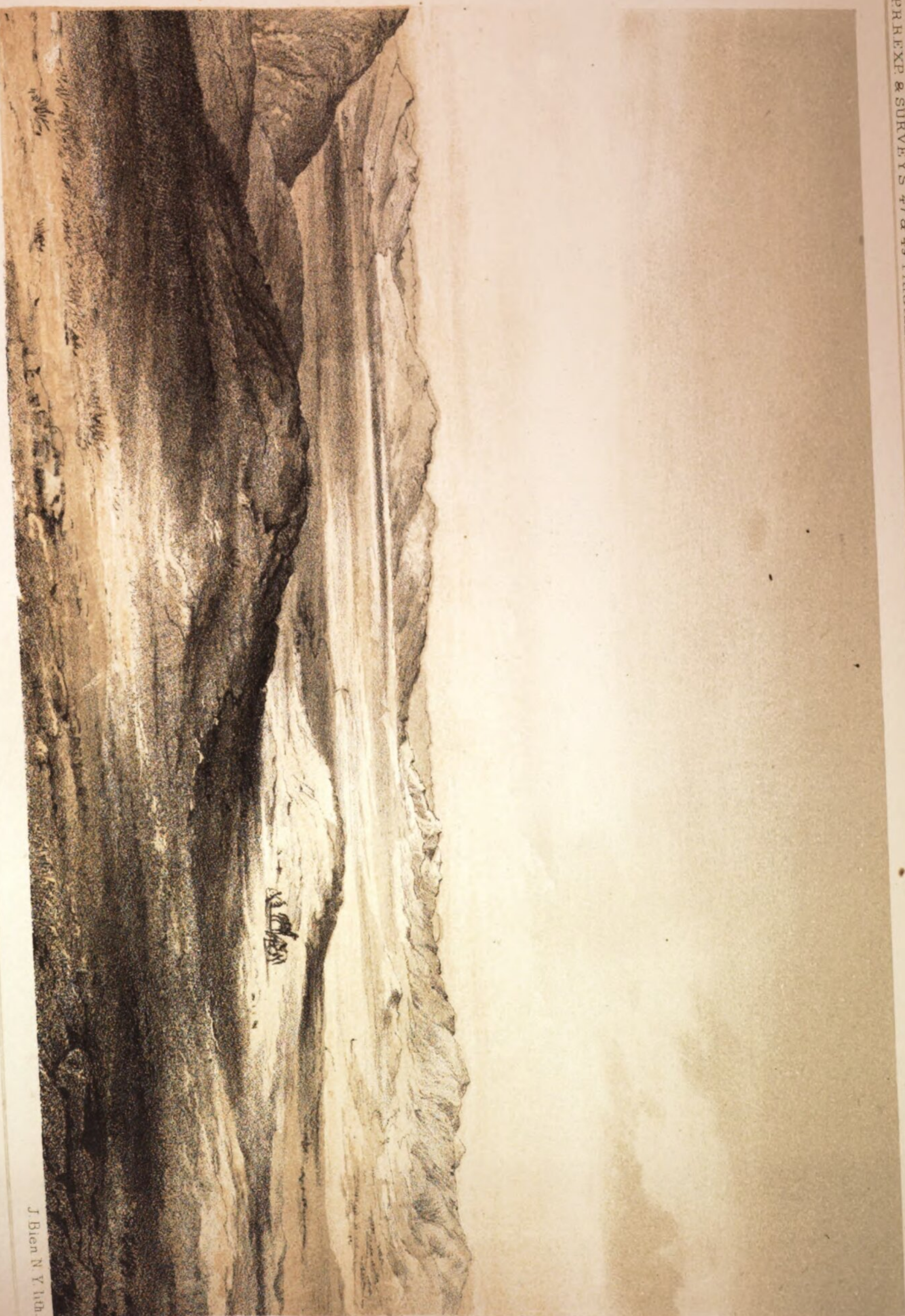
J. Bien N. Y. lith.

Maria's Pass.

NEAR THE LITTLE BLACKFOOT PASS.

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Mr. Doty, in charge of a detached reconnoitring party, retracing Lieutenant Mullan's steps in



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J. Bien N. Y. lith.

CAMAS PRAIRIE OF THE PENA D'OREILLES INDIANS IN THE ROCKY MOUNTAINS. - LOOKING SOUTHWARD.



G. Sohn del

J. Bien N.Y. lith

VIEW OF THE CLARK'S FORK AND THE RIDGE OF MOUNTAINS, SOUTH OF THE FLATHEAD LAKE. — LOOKING EASTWARD.



Stanley del

J. Bien N.Y. lith.

FLATHEAD LAKE LOOKING SOUTHWARD.

July following, remarks of the same pass: "The divide is mainly a high and rolling prairie, the ascent and decent so gradual as to afford a first rate wagon road."

Lieutenant Mullan's barometer having become broken, he was unable to run a profile or give its exact elevation above the sea, but deems an instrumental survey over this pass to be of the first importance; and it is to be hoped that some future survey over this line will yet supply this important desideratum.

I left the city of New York on the 20th of September, reached Olympia again on the first day of December, having been detained in San Francisco over a month by the sickness of my family. On my return I had the pleasure of meeting Lieutenant Mullan and Mr. Doty, who, under instructions sent to them the previous season, had withdrawn their parties from the interior, and were now in the settlements preparing the reports of their labors. As everything bearing upon the feasibility of the country in the way of communications is interesting, I will say that the instructions under which these gentlemen acted were forwarded to them by express from the Columbia valley, previous to which, however, a supply train, under the charge of Higgins, had been sent there with provisions. On this occasion Higgins started about the month of June. The train moved from the Dalles to Cantonment Stevens in some twenty days, and took a route to the Cœur d'Aléne Mission and Pass, and passing over the great plain of the Columbia on a line crossing the Snake river some 35 miles above the mouth of the Pelouse. As he was a man of intelligence and observation, and accompanied me subsequently, I was thus able to verify the general views of the country which I formed.

I now present the following summary of Lieutenant Mullan and Mr. Doty's labors:

SUMMARY OF THE LABORS OF LIEUTENANT MULLAN AND OF MR. DOTY.

The following April Lieutenant Mullan also explored the Flathead river and the country north of it as far as the Kootenay, at the 49th parallel. Leaving the Bitter Root valley on the 14th, he followed the route already used by the main expedition, down Clark's Fork as far as "Kamas Prairie," twenty miles below the mouth of the Jocko. Clark's lake was then 250 yards wide and more than fifteen feet deep, so that he had to make rafts to cross it.

Spring was then well advanced, and the prairie covered with long grass. Between it and Clark's Fork, towards the lake, he crossed a low ridge of hills, thickly wooded; reaching Clark's Fork again, at the mouth of Hot Spring creek, he travelled up its west bank. The river banks and adjoining country, being much cut up by coulées, has the appearance of that on the upper Missouri. The soil is principally a light yellow clay; the stream here is two hundred yards wide, swift and deep, sparsely timbered with pine and cedar, and a few cotton-wood and aspen.

From a high point he could see over the country for a great distance, limited to the eastward by a high snow-clad range of mountains, which runs close to the eastern border of Flat-head lake at its whole length, and continues on northward to the head of Clark's Fork.

Just below the outlet of the lake there is a series of rapids and falls, one of which, at this season, was fifteen feet high. The country to the west of the lake is a high rolling prairie. Salmon trout, three feet long, are caught in it, supplying one of the principal articles of subsistence to the Indians of the country.

Some distance up the west bank of the lake he had an excellent view of it, showing that it contained several large and beautiful islands, all covered with an excellent growth of pine. Many of these islands were several miles long. The width of the lake he estimated at eight miles.

The northern part of the lake is thickly wooded with pine timber around its shores, and the soil is of excellent quality, but grass is scarce until reaching its end, where there is another broad, level prairie extending thirty miles to the north and twenty towards the west. Its northern arm was traversed by Mr. Tinkham, on the way to Marias Pass, as already described. Ragged, snow-capped mountains still appeared along its east side, and curved westward far to the north.

Crossing the west fork, called "Maple river," (although he could find no maple on its banks,) three feet deep, very rapid, and with a rocky bed, he followed it up to the end of the prairie, partially through a dense pine forest. Above this prairie he passed through an excessively thick forest for a day and a half, reaching the head of Maple river and the summit of the ridge separating it from the Kootenay.

Descending the northern slope the timber was much larger, but not so dense, and the country had a much better appearance.

The country now, again, became a high rolling prairie, which extended along the Kootenay and its branch, Tobacco river, for twenty miles or more. The Kootenay was here four hundred yards wide, flowing through low banks with a gentle current. North of it is a range of pine-clad hills extending to the snowy mountains, before mentioned, and towards the northeast these appeared to border both of its banks. The soil along the river was very rich, and covered with luxuriant grass and beautiful flowers as early as April 25. Grass is plentiful at all seasons, and the winters are represented as very mild, while the waters always supply the Indians with abundance of excellent fish. Lead and coal are said to be found on the branches of the river.

Returning southward, he ascended Tobacco river to its sources, west of the range of mountains which border Flathead lake on the west side. Twenty miles south the prairies end, and he again entered the immense pine forest, travelling for forty miles before meeting grass for his animals.

The soil in this forest appeared poor, and on each side of the valley some of the mountains were still capped with snow, though the weather had been very mild and pleasant. At the head of the stream was a fall sixty feet high, the water flowing through high, vertical walls of rock, with an impetuous foaming current, and a noise audible for many miles. The cliffs, several hundred feet high on each side, were covered with forest at their summits.

On the ridge were small prairies containing beautiful little lakes, many of them without outlets, formed by the melting of snow on the mountains around. Crossing this, he reached the headwaters of Hot Spring creek, and again traversed a beautiful rolling prairie country along its east side for nearly thirty miles to where he again entered the Kamas prairie, and on the 5th of May arrived at Cantonment Stevens, in Bitter Root valley, without any difficulties except in crossing the flooded rivers, among which, at the Hell-Gate, his whole party and property were nearly lost in using a raft unmanageable in the swift current.

Lieutenant Mullan crossed by the Cœur d'Aléne Pass in June, 1854, and reports: "Instead of following the southern trail which you followed, I took the one to the north, and thus avoided the steep and high mountain crossed by your party; and though I found the route much obstructed by fallen timber, yet the character of the country offered no further obstruction to the passage of wagon trains or for a railroad route, save the divide itself, which has an estimated height of fifteen hundred feet above the level of the valley, and which from base to base is from a mile to a mile and a half long. The mountain is formed of limestone, schist rock, and friable sandstone. At this point a tunnel from a mile to a mile and a half would be inevitable."

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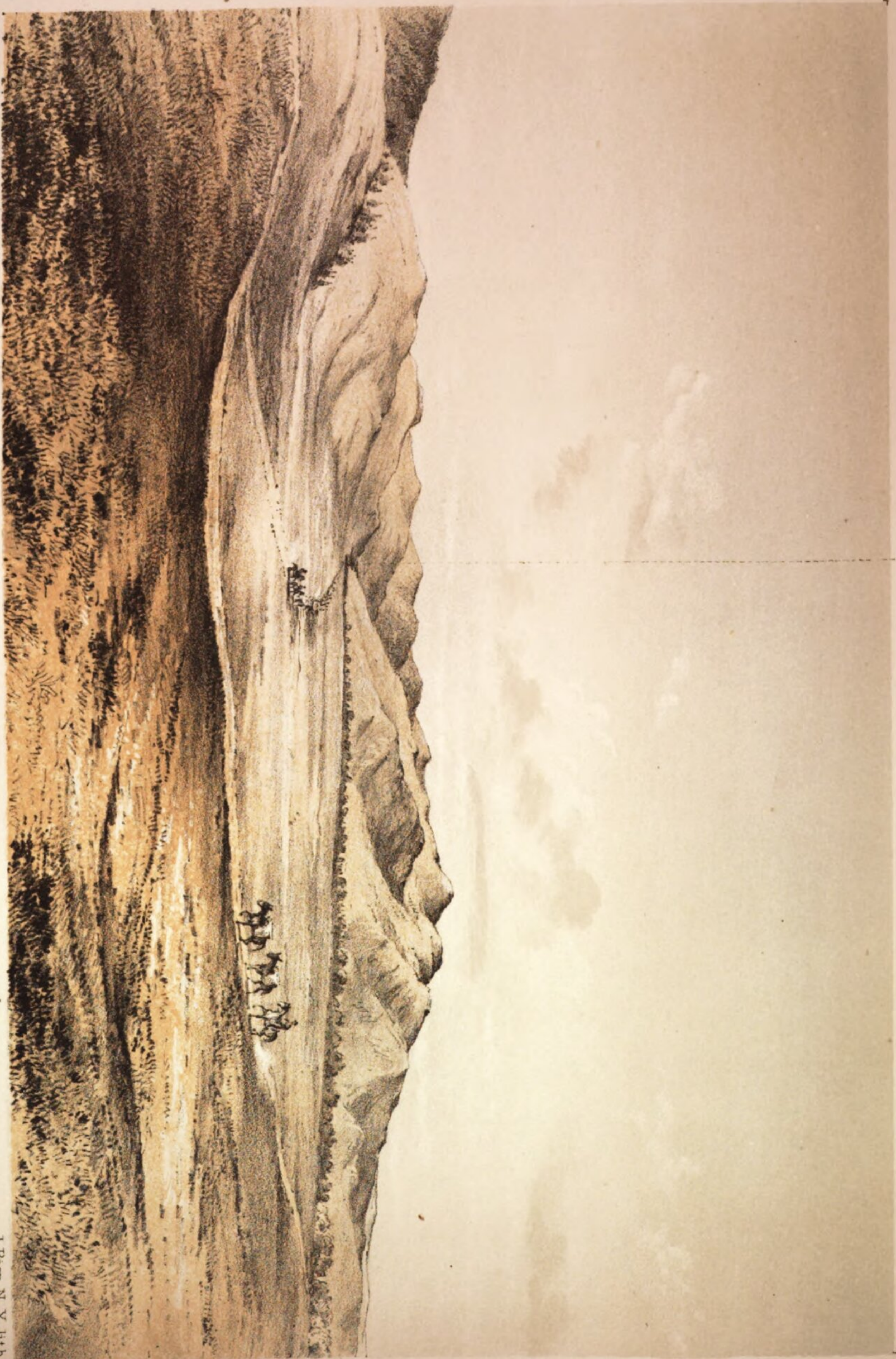
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G. Schom del.

J. Bien N. Y. lith

CROSSING THE HELLGATE RIVER MAY 5th 1854.



ENTRANCE TO THE BITTER ROOT MOUNTAINS BY THE "LO LO" FORK.



Sohn del.

J. Bien N. Y. lith.

HOT SPRINGS AT SOURCE OF LO LO FORK BITTER ROOT MOUNTAINS, LOOKING WEST.

Near the summit of the mountain he found a hot spring with a temperature of one hundred and thirty-two degrees, around which was a fine prairie camping ground. Many of the camps were made in the mountain tops because the river bottoms, being densely wooded, did not furnish grass for the animals of the Indians who had made the route. The valleys, wherever crossed, were rich, and near the western base became interspersed with more prairies.

The route is nearly one and the same followed by Lewis and Clark in 1805, the Lo-Lo Fork being their "Travellers' Rest creek," and the "hot springs" referred to are the same spoken of by those indefatigable explorers.

Leaving the Bitter Root valley again on the nineteenth of September, Lieutenant Mullan went down the river to the "Lo-Lo Fork," which is fifteen yards wide and two feet deep at its mouth. Its valley is five hundred yards wide, and the mountains on each side are quite high and well timbered with pine and cedar, (*Arbor vitæ*.) A good road is found for twenty miles up the stream, partly through prairie and open forest.

Above this the route is over rugged hills to the dividing ridge, which was low and obstructed with fallen timber. On the west side of this he encamped in a prairie, two miles in length, through which flows a branch of the Clearwater or Koos-koos-kia. From this point to the main stream of the Koos-koos-kia, a distance in a straight line of sixty-five miles, he was eleven days in travelling, the whole country being one immense bed of rugged, difficult, pine-clad mountains, with many small prairies among them having a rich soil. The route is thoroughly and utterly impracticable for a railroad route.

Among the trees, the white maple, balsam, spruce, mountain ash, alder, and a cherry appear for the first time in these mountains.

On the second of October, Lieutenant Mullan entered upon the southeastern corner of the great plain of the Columbia, at the point where the Koos-koos-kia emerges from the Bitter Root mountains. Rich "Kamash" prairies occurred at intervals along the river and its branches for many miles before reaching the open plains, and twenty miles from the edge of the forest a branch of the Koos-koos-kia was crossed, flowing through a deep, narrow gorge in the plain, with perpendicular walls like the other streams westward. An open pine forest, eight miles wide, was crossed further west. In one of the narrow valleys many kinds of vegetables were abundantly cultivated by the Indians with great success. The soil is generally very fertile, and in many places a rich loam two feet deep. The Koos-koos-kia is from one hundred and fifty to two hundred yards wide and two and a half feet deep, with a valley half a mile in width, and flows with a gentle and equal current to its mouth. From the border of the forest to its mouth is about sixty miles. On the evening of the fifth he reached the Snake river and encamped on its banks.

Lieutenant Mullan's route, north of the river, having kept at a distance from it and along the summits of the dividing spurs, there is some probability that although the country towards the river appeared to both him and Mr. Tinkham only a mass of wooded mountains, a large level valley might exist and be quite hidden at a distance of twenty to thirty miles, at which the routes of both lay. The general direction of the branches also indicates a great depression near the principal forks and east of the most westerly wooded ridge, at which their routes converge and come out upon the rolling prairie or plain of the Columbia.

At its mouth the Koos-koos-kia is nearly two hundred yards wide, with high bluffs, and destitute of timber, the water of a deep sea-green color and very deep, the banks showing a rise of ten or fifteen feet at the high stage of water above that of October. Seven miles further down

there are several falls and cascades. Between these points and its mouth it has not been crossed or explored by any party of the expedition. On his route westward, about fifteen or twenty miles south of Snake river, Lieutenant Mullan, leaving the river, went up the valley of a small branch called "Alpahwah," between high, steep prairie bluffs, its banks bordered with cottonwood, birch, and various shrubs. It is eight or ten yards wide and fifteen inches deep.

The soil, though in places rocky, appeared fertile, and had been cultivated successfully by the Indians and half-breeds, who also possessed bands of cattle and horses. Leaving this stream, he crossed the rolling prairie to a branch of the Tukanon, five miles distant, which has also a similar valley, with steep rocky bluffs, two hundred feet high and half a mile apart. The stream is of the same size and wooded like the Alpahwah. Ten miles beyond this is the northern branch of the Touchet, separated by a rolling, grassy prairie. Its valley is a mile wide, and bounded by rolling, grassy hills; its banks better wooded than those of any stream met with west of the Bitter Root mountains, and the soil equal to any which had been seen on the route. Lieutenant Mullan reached Fort Walla-Walla on the 9th of October, where he found Mr. Doty, and the Dalles on the 14th, when his party was discharged. He pronounces the trail he passed over the worst of the three he examined, the best being the Cœur d'Aléne trail; Clark's Fork was the third.

Something more, however, is due, both to Lieutenant Mullan and his party and the exploration to which he contributed so largely, than the foregoing narrative of his several journeys. In the establishment of his quarters, the management of his command, and in his intercourse with the Indians, he evinced the soundest judgment, and the whole sphere of duty was filled by him in a manner entitling him to the warmest commendation. I will now give a brief statement of some incidents connected with his post in the Bitter Root valley.

On the 8th of October, 1853, he established his camp ten miles above Fort Owen, at a point where there was excellent grass, wood, and water, and where, in consequence of its being a little removed from the Indian camps, he could better regulate the intercourse of his men with them; and in November, notwithstanding his trip in the meantime to the Jefferson Fork of the Missouri, he succeeded in getting into a state of forwardness the erection of four log buildings for the accommodation of his party, one being a storehouse. Leaving a portion of his party behind to continue the work, he started for Fort Hall, and on his return found the buildings ready for his reception. This was all done by the labor of his own party, the only additional expense being the hire of some oxen to haul logs, and the purchase of hardware, not exceeding in all twenty-five dollars. There was a corral attached for animals. To this post he gave the name of Cantonment Stevens. The accompanying sketch will best describe it. Thus a considerable cost was saved to the government in the way of rent, and there were ample accommodations provided for the use of any subsequent party employed in continuing the work of the exploration, or for the home of an agent sent to the valley to reside amongst the Indians. These considerations were dwelt upon by Lieutenant Mullan in his correspondence with me.

By this time the Indians who wintered in the valley, the Flatheads and some lodges of the Nez Percés, had learned to place implicit confidence in him. I had requested that he should give much attention to Indian affairs, do what he could to impress them with confidence in our government, and, especially, to devote his energies, in concert with Mr. Doty at Fort Benton, to prevent all difficulties between them and the Blackfeet. The Blackfeet, to be sure, were always the aggressors, and the proposed Blackfeet council, which I had gained the consent of all the Indians to hold, and which I had so strenuously and so successfully urged upon the



CANTONMENT STEVENS, - LOOKING WESTWARD.

government, was, by both, constantly presented to the Indians with whom they were respectively in contact, as the most effectual argument to dissuade, in the one case, from aggression, and, in the other, from retaliating with undue severity.

Lieutenant Mullan, besides constant and judicious intercourse with the Indians, always assembled them in council previous to starting on any expedition, informed them of his probable absence, and gave them good advice in reference to their own affairs. They were very glad to have him mediate in their disputes, and they cheerfully acquiesced in his decisions. So much solicitude did he feel in regard to Indian affairs, that in his Fort Hall expedition he made it the subject of a special report, which is given in full in volume I of the Pacific Railroad Reports. In that report, (written from Fort Hall,) speaking of the Blackfeet council, he says: "They (the Flatheads) received the intelligence of the council with much joy and exultation, and they now look forward to the coming summer as the time when they are to date a new and happy period in their nation's history." And again: "The report of the council at Fort Benton has spread throughout the whole Indian country as on the wings of lightning, and has been received as a harbinger of glad tidings to all." I received from him, at every opportunity, reports in regard to the Indian tribes, which were of the greatest service, and which enabled me better to comprehend their feelings, wants, and the proper mode to manage them. The fact that he left the valley in the fall of 1854 with the sincere regret of all the Indians who knew or had heard of him, is the best evidence of his services in connexion with them. Not one unpleasant thing occurred during his year's sojourn in the wilderness which marred the propriety of the intercourse of his party with them, or tended to diminish his influence over them.

The individuals of Lieutenant Mullan's party had equal respect for him, and they were generally cheerful and contented, and prompt to perform their duties. Yet the party was at all times on short rations of flour, sugar, and coffee, and much of the time lived exclusively on meat. I received many letters from him referring to the almost entire dearth of articles which, in settled communities, are considered almost indispensable to sustain life, and urging the necessity of despatching a train with supplies as soon as possible. Yet there was no complaint, and his cheerful spirit impressed itself upon all his men. I had found it impossible to get off a train in the fall and winter, and one did not reach him till June. Some of the provisions left for him the previous fall were spoiled. He passed through the winter and spring quite well, on the allowance to each man of four pounds of fresh beef a day. The Flathead cattle keep in good order through the winter, and no difficulty was found in purchasing beeves at reasonable rates.

I have deemed it a simple act of justice to this most promising and meritorious officer to say this much. His judgment and discretion were equal to his boldness and resource, which qualities had been exhibited not only in his winter explorations, but in those of spring, when the streams were up and hazardous crossings had to be made. He made remarkable contributions to existing knowledge, both of the snows and the geography of the country, at a season of the year and under circumstances when most men would have done nothing. I left with him in October nothing but disabled animals, for every sound one was used in connexion with other parties. The day after my departure he moved his camp to the best grass of the valley, and on the sixth day afterwards he was in his saddle, with a portion of his party, going to the waters of the mission. And such was his promptness and energy throughout.

Mr. Doty left Fort Benton on May 10, 1854, and travelled up the Missouri near its banks to

the Great Falls. He crossed a number of deep ravines, and finally coming to some that were impassable, was compelled to go around them. They are narrow, one hundred and fifty to three hundred feet deep, with a steep descent to within fifty feet of the bottom, and for the remaining distance perpendicular walls of red sandstone. A similar cliff occurred on the Missouri, at the falls. Above the falls the banks are low, the soil a light, sandy loam, of considerable fertility, and bears a luxuriant crop of grass. The timber is poor, consisting of small cottonwood, willow, birch, and box-alder.

Sun river at its mouth was then one hundred and seventy-five yards wide, deep, and with a strong current, differing from the other branches of the Missouri lower down in having a broad valley, bounded by hills of easy slope. From the abundance of rain at that season the travelling was very bad in the valley, but he found a good road on the hills.

About thirty miles from its mouth are "Crown Butte" and the "Big Knees," lofty flat-topped buttes, called by the Indians the "Rattlers," and prominent as landmarks, indicating the position of Lewis and Clark's, and Cadotte's or Blackfoot Passes, as they can be seen from the Highwood mountains, sixty miles distant. Twenty miles further, cliffs come so close to the river as to compel an ascent to the table-land, which he followed parallel to the course of its north fork or Elk river for about twenty-five miles further. Here the face of the country clearly indicates the approach to a great mountain range. Huge fragments of granite, limestone, and sandstone are scattered over the plain. Out-croppings of sandstone and limestone were noticed with a nearly vertical dip and running north and south. Scattering scrub pines also begin to occur large enough for railroad ties. Still higher up the river beautiful valleys continued, sometimes two miles in breadth, covered with flowers, and with small lakes, on which were numbers of water fowl.

The valley then narrows, bottoms disappear, and the river is shut in by lofty precipices. Then comes a perpendicular wall of limestone rock one hundred feet high, in which is an opening twenty feet wide from top to bottom, and through this the river flows in a swift, deep current. Its sources were evidently far up in the mountains, and Mr. Doty found it impossible to reach them even on foot, but ascended one of the high peaks near by, from which the river was magnificent. Above and around were snow-covered hills and the breath of winter, while the luxuriant grass and gay flowers in the valley far below were fast approaching maturity under a summer sun. At this high elevation there was still no timber suitable for building purposes.

From Sun river his course lay close along the mountains, over hills of considerable elevation, covered with pines twenty to thirty feet high, through which he had much difficulty in taking the odometer wagon.

The soil continues gravelly and poor among these ridges and plateaus near the headwaters of Teton river, and there is but little timber on the banks of the streams.

Northward of this river, and still at the base of the mountains, the country is a stony plain, intersected by numerous spring brooks, running through deep, narrow valleys, in which the soil is good.

Tracts thickly wooded with scrub pines, and many marshes, rendered travelling slow and laborious; considerable snow was seen May 20th, low down in the mountain, and some even in the valleys, but beautiful flowers were at the same time blooming by the side of a snow bank six feet deep.

The appearance of the country still continued to improve in going northward among the



GREAT FALLS OF THE MISSOURI RIVER.

branches of Marias river, and the mountains are covered with large pines and firs, while on the river banks cotton-wood, birch, and willow reappear. Many small lakes occur from one to twenty acres in extent, clear and deep. The grass was so luxuriant as to form a heavy turf, and the soil a rich loam.

On the headwaters of the Kayiyou or southern branch of the Marias river he found fertile valleys, in which were many small lakes and groves of tall pines, which finally prevented further progress up stream.

Marias river comes through a gap in the mountains some fifteen miles in width, the country around hilly and densely timbered with pines, but the soil rich, even on the highest hills. There are also many grassy openings or prairies from one to ten acres in extent. The stream was completely hemmed in by perpendicular banks from 150 to 300 feet high, and was swift and deep, so that it was impossible to cross it at this place, but by following it up for several miles a practicable ford was found.

Along this branch an old Indian trail showed that it led to one of the passes across the Rocky mountains. Further north the mountains become more rugged in character, loftier, and covered with snow 300 feet below their summits.

The country is considerably broken by high hills and narrow valleys, by spring brooks, filled with thickets of poplar and willow, and flooded by beaver dams. Several smaller branches were crossed before coming to Cut Bank river, the most northerly tributary of Marias river. This is a rapid stream fifty feet wide, flowing through a rich valley, with banks of yellow clay and marl, in some places perpendicular, but generally low and sloping. Upon its headwaters is the pass called "Marias," explored by Mr. Tinkham, and a broad lodge trail leading up the valley showed that it was considerably used.

Crossing a range of high hills, Mr. Doty reached the headwaters of Milk river, among which the country is quite flat and full of springs and brooks. A heavy forest of pine extends several miles from the base of the mountains, among which, one called Chief or King mountain, is a bare rocky peak, of a square form, standing five or six miles from the main chain, and connected with it by a high wooded ridge.

Seventeen miles further he came to a broad valley, its sides wooded with pine and poplar, (aspen?) and in the bottoms, five hundred feet below, saw the blue waters of Chief Mountain lake. Descending into the valley, in four miles he reached the lake and encamped on a beautiful prairie bordering it.

This lake is seven miles long, one broad, very clear and deep, and with low gravelly shores. Its valley is six miles in breadth, a rolling prairie, interspersed with groves of cotton-wood, poplar, birch, and willow, in the lower grounds. The soil is a reddish loam and very fertile, as is indicated by the luxuriant vegetation. Large pine is abundant, and there are inexhaustible quarries of good limestone.

Another lake, called Bow lake, is connected with it, and extends into the mountains nine miles, but has no valley susceptible of cultivation, as the mountains come close down to the water. It was at first supposed that there must be a good pass in this vicinity, but a close examination satisfied Mr. Doty that such was not the case.

Numerous little streams empty into this river, and these lakes are filled with beaver dams, and beaver, elk, moose, and deer, were abundant, and trout of a large size were taken in the lakes.

The outlet of Chief Mountain lake, called by the Blackfeet Mo-ko-un, is a swift, deep stream,

eighty feet wide, and having a course for some miles due north. It is the most southerly of the waters of the Saskatchewan, and after receiving several branches from the principal south branch of that river. Its valley is three miles in width, strong and sterile, high hills bounding it on each side, and the country generally is broken. Twenty-five miles down the stream the country improves, but there is very little timber on the streams, and this ends entirely on its emergence from the mountains.

The exploration ended here, having reached latitude $49^{\circ} 30'$. The boundary line is about ten miles north of Chief Mountain lake, and therefore includes entirely the sources of Marias and Milk rivers.

From the end of the route, looking towards the north and east, Mr. Doty saw "a vast plain, or, more properly speaking, a prairie; for in richness of soil, luxuriant vegetation, and bright-colored flowers, it greatly resembles the prairies of the western States." These appeared, however, to be a stretch of fifty miles, destitute of wood.

Turning back on the 8th of June, Mr. Doty retraced his route as far as the Marias, already referred to, as issuing through a gap 15 miles wide, and along which was an old Indian trail, and followed it up on the trail for thirty miles to the southwest, finding no obstruction, except from trees; and at that distance, ascending a lofty hill, saw no mountains in the direction of the stream. On each side the mountains were lofty and rugged, showing, generally, perpendicular rock from within 300 feet of their summits, which were covered with snow; and snow banks were also found on the north side of many hills. It is to be regretted that Mr. Doty did not continue on, and ascertain where the trail issued on the western side of the mountains.

From here he moved off toward the southeast, directly for Fort Benton, by the valley of Teton river. The country now became a vast plain, descending towards the east, the soil of inferior quality, and the dry vegetation indicated the change in the climate observed in going over these high, dry plains towards the Missouri. At the same time, heavy showers were occurring in the mountains; but two passed over him, giving only a few drops of rain, though the thunder and lightning were terrific. But on June 13, twenty-five miles from the mountains, a severe storm of rain and hail fell in torrents, covering the valley of the Teton to the depth of four inches. This portion of the valley he describes as "of no use for farming purposes, and the yearly fires will soon consume every stick of wood."

Here is the hill, some two hundred feet high and perfectly resembling a woman's breast, from which the river derives its name, called by the Blackfeet "Mon-e-kis." This hill is visible from a long distance.

Below this point the valley, for more than 125 miles to Fort Benton, was well timbered with cotton-wood, covered with luxuriant grass in the bottoms, and the soil appeared rich, being still very soft from recent heavy rains. At the middle of June vegetation was in its highest state of perfection, the ground covered with brilliant flowers of the cactus and lily, and the air perfumed with the scent of roses.

Mr. Doty reached Fort Benton June 19, and found the Missouri full, nearly level with its banks, which appeared like a mighty stream in comparison with the little rivers he had crossed. The general results of his reconnaissance were a thorough exploration of the Missouri, along the base of the Rocky mountains, to the parallel of $49^{\circ} 30'$, carrying a correct odometer measurement to the boundary; discovering the sources of the Sun river, Breast river, Marias river, Milk river, and their branches, and also Mo-ko-un, or Belly river of the north, and their general characteristics; ascertaining the existence of a large body of agricultural land, and

proper localities for farms, and the general capabilities of the country for settlement, and collecting specimens in geology, natural history, and botany. Three hundred and twenty varieties of flowers, many of which, it is believed, are new to the botanist, were collected and carefully preserved. The barometrical observations were continued as far as Badger river, when the barometer was broken. Observations were taken for latitude, and the distances ascertained by the odometer. Unfortunately the specimens were not forwarded down the Missouri, as directed by Mr. Doty, and on my return to Fort Benton all the botanical specimens were moulded and useless.

Mr. Doty now remained at Fort Benton till the 8th of July, when, with Mr. Burr, who had brought him my instructions, transmitted through Lieutenant Mullan, to remain in the country till further orders, and with two men, he started on a trip to the Bitter Root valley, following the trail pursued by me in 1853, till within ten miles of the divide; he then changed his course to Lewis and Clark's Pass, and struck the trail pursued by Mr. Lander, and continued on it, crossing the divide, till he came upon my trail again, some $12\frac{1}{4}$ miles west of Cadotte's Pass. He followed on this trail to Fort Owen, except that, seven miles before reaching the lower cañon of the Big Blackfoot, he turned to the left, and in six miles crossed that river, and passing through open pine woods for five miles, came out upon a beautiful prairie, four to ten miles in extent, having a rich soil of black loam, covered with luxuriant grass, and which is known as the Kamas Prairie of the Flatheads. Passing through scattering pines of large growth and small prairies, he struck the Big Blackfoot at a shallow ford only six miles from the junction of this river with the Hell-Gate. He crossed the ford, when his route continued the same as that of the main train. This cut-off saves some very bad side-hill travelling along the Big Blackfoot. Reaching Cantonment Stevens, he remained five days, and he describes the Bitter Root valley as one of the most charming spots he ever beheld; as, in truth, a paradise.

On his return he followed the Hell-Gate and Little Blackfoot valleys, moving in the trail over which Lieutenant Mullan had taken a wagon the previous March. He found the high water trail on this route not so favorable for a pack train as that in the Big Blackfoot, and reached Fort Benton July 30, having made the distance, both ways, in seventeen travelling days. On the 15th August he started down the river to meet the company's boats.

Returning to Fort Benton he found my instructions of June 2, from Washington city, again despatched, as before, through Lieutenant Mullan, by the hands of Mr. Burr, directing him to proceed to Olympia. On the 7th September he was on the road; but was delayed in consequence of endeavoring to drive oxen too fat for the journey over to the Bitter Root, and was at length compelled to abandon the undertaking and to send them back to the fort. He pursued essentially his former route; and after making the necessary arrangements with Lieutenant Mullan, at Cantonment Stevens, he left on the 19th September, pursued my trail of 1853, over the Cœur d'Alène mountains to the Cœur d'Alène mission, and then separated from my trail to take one more direct to the Walla-Walla, south of Cœur d'Alène lake.

Crossing the Cœur d'Alène river about sixty miles east of the crossing of the main train, and above the lake of the same name, he passed through prairie for four miles, south of the river; ascended a high ridge for a mile and over a rolling country, with scattering pine timber, seven miles, to a stream flowing into the lake and running through a fertile valley.

Leaving the south end of the lake, he went up a narrow valley, up a gently rising slope, for four miles; and ten miles more through rolling country, sparsely timbered with pine, little undergrowth, and plenty of grass. Then came a large prairie, stretching away towards the

west beyond view; its soil a black sandy loam. South of this is another high ridge, of six hundred feet elevation, and an easy ascent for a mile. From its summit the plain was seen towards the west and south, bounded only by the horizon, and the distant spurs of the Blue Anks. Several small streams run from the foot of these ridges to the west, forming by their junction the south branch of the Cœur d'Aléne.

For twenty-two miles to the southwest of this ridge he met neither wood nor water, though he crossed the dry bed of a stream at about half that distance, striking the main western branch of the Pelouse, which is thinly bordered with pines, cotton-wood, and willows; it was there twenty feet wide and one foot deep, flowing over a pebly bottom. The soil of its valley is a rich loam, the valley narrow and bordered by basaltic precipices. Forty-nine miles further, keeping more to the west, he struck the Pelouse four miles above its mouth. The longest interval between water was eighteen miles, and the country gradually becomes more broken and rocky, as in following down the stream from the north. A branch was crossed, fifty feet wide and two feet deep, with a valley like that of the other branches.

Just north of the first branch of the Pelouse is a lofty hill, called Pyramid Butte, towering high above the prairie.

Mr. Doty now followed the usual trail to Walla-Walla, which he reached on the 7th October. Here he was unable to procure guides to cross the Snoqualme Pass; for he was instructed by me to observe for altitude and carefully carry the railroad line down from that pass to the sound, and, as his barometers were broken, he concluded to follow the emigrant road over the Nachess Pass. Crossing the Columbia on the 11th, the next day he started, and reached Olympia on the 24th of the same month.

Besides his explorations, Mr. Doty made several reports on the Blackfeet Indians, and acted as their agent during the whole time he was among them. He visited their winter posts on the Milk and Marias rivers, during the winter of 1853 and 1854. By the measurement of several hundred Indians, taking them indiscriminately, he found the average height of the adult males was about five feet eleven inches.

We had the great misfortune to lose nearly the whole bulk of our meteorological observations, which, in charge of Lieutenant Donelson, on his return from Olympia to Washington City, were in the hands of the express company for safe transportation, and were lost by them on the steamer. It is sufficient, for the vindication of the exploration, to say that every means was taken to recover them. As I have frequently observed, the observations were exceedingly numerous, not only those by Mr. Moffett and his assistants, moving with the main train, but of Mr. Tinkham, Mr. Lander, and others, in side work. Many days there were twenty or thirty different observations on and off the route; for, to the extent of the force, all effort was made to get positive and fixed data for an approximate location of the road and determination of the whole either of excavation or embankment required for its grading. Lieutenant Donelson, in his anxiety to get the observations, very cheerfully complied with the orders of the War Department, to repair to San Francisco in search of them. I met him at Acapulco, on his return to the States, when all hope of recovering them had to be abandoned.

While in the city of Washington I urgently pressed upon the War Department the continuation of the survey, and particularly an instrumental, *properly speaking*, survey of mountain passes found, by reconnaissance, to be most practicable. Especially did I dwell upon the importance of the instrumental survey of the Snoqualme Pass, and of carrying the line down to the sound. With the ordinary instruments used in exploring parties the work is simply that

of reconnaissance, and, excepting some few mountain passes, which had been carefully levelled and the direction properly taken with the more refined instruments of engineers, there had been and have been no instrumental examinations on any of the routes. On my return to Olympia, and on possessing myself of all the information which had reached me subsequent to my leaving the city of Washington, I became the more impressed with my duty to urge this matter upon the department; and when I relieved Lieutenant Mullan from duty and directed him to report at the city of Washington, I urged his being assigned to the duty of going up the Missouri with the party for the Blackfeet council to be sent from that side, in order to carry a line of levels from Fort Benton westward, to examine certain routes deemed by him, and by me, to be, probably, practicable, and thus, while gaining additional information, to get a new line of observations in replacing those which we had so unfortunately lost. I will remark that all the observations were lost of the eastern party, except those of Lieutenant Donelson up the Missouri, and those made at the winter posts at Fort Benton and Cantonment Stevens.

It is not my intention to do more than simply refer to my duties as Indian commissioner in connexion with its bearing upon a knowledge of the country. During these winter months, especially January and February, I made treaties with all the Indian tribes of the sound, and held councils with all the remaining Indians of the territory west of the Cascades, which enabled me to get a large amount of information in regard to the character of the country, and especially of its capacity for settlement, for the question, "Where shall the reservation be established?" made this information an indispensable necessity in order to arrive at just and sound conclusions.

Whilst these operations were going on west of the Cascades, in the way of making treaties, Mr. Doty was moving among the tribes east of the Cascades, in order to make arrangements to hold councils with them. This took him to the Yakima country, into the Walla-Walla valley, and to the Nez Percés country, where he held councils with the various tribes, each in its own country, and where the arrangements under my instructions were made that all should assemble at their old council and peace ground in the Walla-Walla valley. The goods for this council were sent up the Columbia river in keel-boats, they having been wagoned to the mouth of the Des Chutes, and thence taken up the river. This may be said to have been the commencement of the navigation of the upper Columbia with keel-boats; and so practicable is the Columbia in this respect that the main bulk of the supplies for the Walla-Walla post during the past two years have been taken on the line of the river in sailing vessels carrying from forty to sixty tons burden. No difficulty whatever has been found in running up in all the rapids, and the trip has been made from the mouth of the Des Chutes to old Fort Walla-Walla in twenty-four hours.

About the middle of May, 1855, I started from Olympia, and moving rapidly to the Walla-Walla, joined Mr. Doty at Camp Stevens, on one of the tributaries of Mill creek, on the 21st day of May, 1855. The account of my subsequent explorations (which is simply a continuation of this exploration) I have denominated the narrative of my explorations in 1855; but this narrative I will conclude after some general remarks.

It did not seem advisable to the War Department to order a continuation of these surveys, nor have I ever complained that such continuation was not ordered and placed in my hands. It was unquestionable that a considerable sum had already been expended, and if the information which I had furnished was deemed decisive and controlling in favor of the question of railroad practicability, or if the due allotment of the appropriation had been assigned to the northern route, it was wise and just to apply the subsequent appropriations to points where the

question was still doubtful, or which had not received their proper share of attention. I only regretted that, as it was admitted that the question of the snows of the Snoqualme Pass could only be settled by actual admeasurement, a winter post at that pass was not established in order to procure reliable information. When the time comes for building the railroad over this northern route, the engineers will then make this examination if they are not satisfied that the snow is not an obstruction. They will make the instrumental survey of the Snoqualme Pass to the sound, because it is a question of the saving of some 130 miles over the route by the Columbia and the Cowlitz. If we look to how railroads have progressed in this country, particularly to the earlier roads; if we look to present projects now being carried into successful execution, we shall be convinced of the truth of this observation. On some of the old lines of railroads, simply to improve grades a little and to get a better location for depots, the old track has been replaced by a new one, sometimes for one-quarter of the whole length of the road; in some cases there not being an interval of a mile between the two tracks at any point. This is the case with the Boston and Maine railroad. But when grades are eighty feet, and more, engineers and business men have deemed it expedient to open other lines where the grade could be reduced, even if it involved costly and excessive tunneling. This is the case in Massachusetts. The Great Western railroad of that State, coursing along its southern border, and having its terminus at Albany, has grades of eighty feet or more; and now along the northern border of the State they are tunneling the Hoosac mountain as long, probably, as any tunnel on the northern route, in order to get the grade down to sixty feet, and to open another connexion between the waters of the Hudson and those of Massachusetts bay, at a saving of distance of only forty miles. These instances might be multiplied almost indefinitely, and they show precisely what our people will do when they come upon the work of our great overland communications.

I had taken, however, the precaution to order from New York some barometers, and to get suitable supplies of drawing materials and stationery, with a view, as I reported to the department, of availing myself of every mode to gain a knowledge of the country.

And in submitting the following report of my explorations of 1855 it is but justice to myself to say that the whole of it was done without any pecuniary assistance whatever, except the payment of the purchase referred to. It was done and with great personal exertion, as extra duty by myself and the two gentlemen with me, without causing the delay of the train for a single moment or the hiring of a single additional man. And thus did I gain facts which tended to verify the accuracy of the general results in the way of altitude in 1853; for I happened to have in my possession the copy of the preliminary computations for altitude, as derived from the barometrical observations; had it not been for this, I would not have my data even for publication in regard to profile. The profile itself was drawn in Olympia previous to my departure.

It will also be observed that Mr. G. W. Stevens, who had brought the portable transit through on the backs of animals from Fort Benton in 1853, had a little observatory made at Olympia, where he determined the latitude of that point. This young gentleman was of great promise, but to the affliction of all his friends he was drowned in the Skookum-Chuck in February of this year. He was my private secretary, and I had been exceedingly anxious that he should have an opportunity of resuming employment on the survey, and of going over the country to determine carefully the geographical positions. From causes already adverted to, our results for longitude were not reliable.

I had forgotten to mention in the proper place that Lieutenant Arnold, who, under my general supervision, had relieved Captain McClellan from the charge of the military road from Fort Steilacoom to Fort Walla-Walla, executed the duty greatly to the satisfaction of the people and of the emigrants who went over the road, as well as to the satisfaction of the department. From his report to the War Department I give the following brief abstract and itinerary of his route.

LIEUTENANT ARNOLD'S LABORS.

For 1854 and 1855 Lieutenant Arnold completed the military road across the mountains by this pass, which had been commenced by the citizens of the Territory, and by Captain McClellan's party in 1853. He thus reports on the nature of the country as it appeared to him in early summer:

Leaving Steilacoom, on the shores of the sound, the road crosses a tract of open prairies about ten miles in length, and nine in width, a part of what is known as "Nisqually" plains. These plains are interspersed with beautiful lakes and scattered groves of timber, mostly oak and fir, the former of which must be of great value for ship building and other purposes at some future period. The soil throughout is generally gravelly, except along the borders of the creeks, where it is black loam, the best proof of the richness of which is that every acre is settled upon.

From the plains it passes through thick timber for six miles to a high ridge bordering the valley of "Puyallup" river, and forming the limit of the gravelly district. This valley is from two to four miles wide, lying, like those of the "Nisqually" and Whitewater, between high perpendicular bluffs, and covered with a heavy growth of timber, consisting of arbor-vitæ and spruce, and with thick underbrush, chiefly willow and vine maple.

The soil is rich but somewhat sandy; above the crossing the stream forks, and is made up of many tributaries, along the banks of which large prairies are found, capable of a great yield to the agriculturist with little labor.

The "Puyallup," fordable except at the highest stage of water, is generally about one hundred feet wide, and two and a half feet deep at the ford.

Leaving this bottom, the road passes alternately through small prairies and timber to Whitewater or "Skamish" river. This stream is a perfect torrent, fordable only three months in the year, and even then the force of the current and exceedingly rocky bed renders the transit with the pack animals and wagons both difficult and dangerous, particularly for emigrant stock that has crossed the plains and Rocky mountains.

One of the most striking peculiarities of this stream is the milky color of the water, due probably to some earthy substance found along the northeastern side of Mount Rainier. Beyond this crossing lies a succession of fine prairies for seven miles, after which there is no grazing to near the summit of the mountains.

The soil bordering the river, including the prairies, is wet, though elevated, consisting of a mixture of clay and vegetable mould, which retains the moisture of the winter rains until near midsummer. With this exception, few sections offer greater inducements to the settler, and none surpass it in fertility.

From the last prairie the road passes over a high hill, very appropriately called "Mud mountain," the soil being similar to that of the prairies. A thorough examination of this mountain was made, but high perpendicular bluffs running to the river, and a complete

network of fallen timber, left no choice but to follow the location of the previous year. The greater part of this tract was made passable by a series of heavy cedar bridges. Descending again to the river, the road continues up the valley, making six crossings, which cannot be avoided except by heavy side cutting, and in many cases blasting; but in the event of another appropriation he strongly recommends that they be avoided.

Leaving Whitewater the road enters Green River valley, and, with the exception of a short distance where there are cañons, continues through it to the mountain. This deviation involves two hills, the highest fifteen hundred feet. Here, as well as along Whitewater, he says he should have made more improvements, but for the important obstacles still to be encountered. The appearance of this valley is like that of Whitewater, but in approaching the mountains the ranges rose higher and gradually closed in, forming near its head a continuous cañon, and necessarily involving seventeen crossings. The river has an average width of forty feet, with a gentle current, and the bottom generally rocky. It can be forded whenever the road is passable.

Near the junction of Whitewater and Green rivers there is a remarkable peak called "La Tête," from a large rock on its slope resembling the head and neck of a man. This is an important point, as it forms the gate of the mountains on the west.

Four miles beyond the only prairie above the forks is found, and would afford some grass for passing droves, but for the numerous bands of Indian horses constantly crossing here. He strongly recommends sowing two or three hundred acres here with grass seed, as the woods around were burnt off many years since.

With the exception of the trails mentioned, the entire valleys and surrounding heights are studded with a dense growth of timber, mostly fir and spruce, with some hemlock, and now and then a pine, and the ground is covered with fallen trees, from four to six feet in diameter, and from one to three hundred feet in length. In many instances he noticed thrifty trees, three or four feet through, growing upon others much larger, which had fallen, and which, upon inspection, proved perfectly sound. This will give some idea of the amount of labor expected throughout this distance.

The ascent from the valley to the mountains was originally an unbroken slope of thirty-three degrees, and probably one of the most difficult in the country. This he reduced to a practicable grade. Other steep slopes followed, many of which were graded, but not as much as he wished to have done if the amount of money at command had allowed of it.

On the summit the mountains spread out towards the south, forming an extensive flat, filled with ponds, interspersed with prairies, and in other places covered with a dense but small growth of timber. The road skirts four prairies in the distance of two miles, which afford excellent grazing and an abundance of fine spring water.

Under the most favorable circumstances this part of the route will not be passable for wagon trains more than five months in the year. On his first reconnaissance (about the 28th of May) he found four feet of snow for five miles, and in many places from six to ten. On his return, after the completion of the work, the last of October, he found from one foot to eighteen inches of snow along the summit, thus showing that the interval was within five months for that year.

In crossing, about September 12, in 1853, Lieutenant Hodges encountered a slight fall of snow, but it did not remain, for emigrants, crossing several weeks later, found none in the pass, and none fell until the third of November, and then only to the depth of four inches.

Near the dividing ridge is situated Mount Ikes, about 5,100 feet above the sea, from whose summit he obtained a magnificent view of the surrounding country, extending beyond the sound to the west, on other sides limited by the mountains and their spurs.

To the south Mount Rainier appeared in all its majesty at a distance of fifteen miles, and towering far above him; to the east was the valley of the Nachess; to the north, the serrated volcanic (?) range near the Yakima Pass, and the beautiful ridge bordering that river on the north.

The eastern slope of the mountains was very favorable, and required comparatively little work. Descending from the mountains, the road crossed Nachess river, a beautiful stream about twenty feet wide at the ford, having a gentle current and rocky bed, and entered a most picturesque valley. High ranges, in some places forming steep, perpendicular cliffs not less than 2,000 feet high; in others, graceful slopes covered with a luxuriant growth of bunch grass and thrifty timber; rapid mountain streams, forming at their mouths islands covered with groves; and the numerous rivulets traversing the prairies that border the river, make the scenery particularly striking when compared with the cold and dismal forests of the western valleys.

Vegetation matures much sooner on the east than on the west side, showing that the snows must melt much sooner.

The road crosses and recrosses that stream forty-four times; then crosses a ridge to the valley of the "Wenass," with an ascent of about 800 feet; but from Captain McClellan's observations this might be avoided by following down the valley of the Nachess to its mouth. Four miles below the Wenass is the first ford of the Yakima, which, during the travelling season, is there about one hundred yards wide, and not over eighteen inches deep in mid-summer.

From this ford to the bend of the Yakima there is barely a sufficient supply of water along the road, except at stated camps, and at them it is disagreeable and injurious, being strongly impregnated with sulphur.

Fuel for cooking purposes is also very scarce, but there is abundant grazing. Near the mouth of the Yakima is an excellent point for a recruiting camp for emigrants coming from the east. The remainder of the route to Walla-Walla is over the level sandy bottom bordering the Columbia for seventeen miles.

Lieutenant Arnold urgently recommends that an additional appropriation of ten thousand dollars should be made, which will give the work a permanence and stability that it justly demands.

Distances measured by the odometer on the military road from Walla-Walla to Steilacoom, constructed by Lieutenant Richard Arnold, 1st Lieutenant 3d artillery, United States army.

	From point to point.	From Steila- coom, eastward.
	Miles.	Miles.
To Puyallup river.....	22½	22½
To first crossing of Whitewater.....	9½	31½
To last prairie on Whitewater.....	6½	38
To second crossing of Whitewater.....	11½	49½
To sixth crossing of Whitewater.....	5½	55½
To La Tête.....	3½	59½
To first crossing of Green river.....	1½	61½
To Bare prairie.....	2½	63½
To western base of mountains.....	10½	73½
To first prairie on the summit.....	3½	77½
To last prairie on the summit.....	2½	79½
To first crossing of Nachess river.....	5½	84½
To crossing of Papat valley (6 m. wet).....	10½	95½
To mouth of Bumping river.....	4½	99½
To last crossing of Nachess river.....	11½	111½
To Wenass river.....	10	121½
To turn off Wenass valley.....	16	137½
To first crossing of Yakima.....	4	141½
To water in crossing bend of Yakima.....	18½	159½
To 2d water in crossing bend of Yakima.....	7½	167
To Brackish spring (undrinkable).....	16½	183½
To Yakima, below bend.....	18½	202
To Yakima, near mouth.....	15½	217½
To end of road, opposite Walla-Walla.....	17½	234½

There is a foot trail leading from the head of Lake Kitchelus to the head of the Snoqualme, forming the true Snoqualme Pass. The Indians represent this as practicable on foot with the greatest difficulty, and that it is seldom used. In Mr. Tinkham's winter examination, the Indians who accompanied him reported this pass to be better and more free from snow than the Yakima Pass, but more obstructed by fallen timber, and therefore impracticable with horses.

About May 15, 1856, Captain Smalley crossed this pass and found snow only for two or three miles—the greatest depth four feet.

On June 20, 1856, Major Van Bokkelen went up Snoqualme river from the falls, 35 miles, passing through prairie for five and a half miles, and the rest through forest greatly obstructed with timber. After passing the summit he lost the old Indian trail, and going for ten miles southerly by compass found another, and four miles further reached Lake Kitchelus. As this trail ended at the lake, he was obliged to force his way along its western shore for eight miles over rocks and timber, and at its lower end reached the foot of the Yakima Pass. The Indian trail passes around the east side of the lake. The whole ascent of the west slope is by a *gradual* rise.

Some of the country on the western slopes of the Cascade mountains has already been

described in the account of the routes across the Tlickontat and Snoqualme Passes. This description will apply to all that lying among their western spurs as far as at present explored. Since the period of the expedition, the surveys of the Land Office, and reconnaissances by various parties of the Washington Territory volunteers and others, have given to these districts even a more favorable character than might have been expected. Though the greater portion of the mountain spurs are covered with a dense forest of gigantic growth, there are along all the rivers, and at conveniently short intervals, prairies varying in extent from one to ten square miles, with the most productive soil, and offering to the pioneer farms already made to his hand. They must thus serve as a nucleus for the commencement of settlements, and can support a very numerous population until its increase, and the gradual consumption of timber, requires the cultivation of the equally rich forest lands. Many, indeed, have already preferred to clear lands in the forest, and found it more profitable than to occupy prairies at some distance.

Descending to the valley bordering Puget Sound, the Nisqually, Upper Chehalis, and Cowlitz rivers, we come to a vast extent of nearly level country, in which prairies are much more numerous and extensive, and where also the wooded bottom lands and often the uplands are *all* cultivable and valuable. This tract has a length, north and south, of 250 miles on the meridian of Vancouver; and allowing it only thirty miles of width, in order to allow for the water surface of the sound and for occasional mountains, we have an area between the Cascade and Coast mountains alone of 7,500 square miles, or 4,800,000 acres. This constitutes the "Valley" of the Territory, and is continuous with the famed Willamette Valley, of Oregon, which it quite equals or exceeds in productiveness. One-third of this may be estimated as prairie, though much remains to be explored.

Forming an outlet to this on the west is the Chehalis valley, fifty miles long, passing through the Coast range and continuing in a width averaging fifteen miles—480,000 acres. In the Willopah valley there are about 103,680 acres, and as much more level land along the coast, making, exclusive of the Columbia valley, 5,487,360 acres of level land between the Cascades and the ocean.

The Columbia, below the Cowlitz, presents to the traveller the appearance of having much less valley than it really possesses. High mountains of the Coast range rise very near its banks, but there is a wide bottom land of good soil almost everywhere; and the upland consists, in great part, of tables, which, though thickly wooded, are, from their location along this mighty river, more valuable than might be suspected. Their rich stock of timber is easily got into the river, and the soil left behind is generally of superior quality. No prairies occur on the Columbia below Kathlamet, except those called tide-lands, near its mouth, which only need embankment and drainage to make them cultivable. In the estimate, only such lands are included as are at once ready for occupation.

When a population has been established requiring more than 6,500,000 acres for their support, besides the products of trade in the lumber and other products of the country, as much more land lies west of the Cascade range, which by that time will be made accessible and even more valuable for agriculture than what is now presented. The whole area of land west of the Cascade range may be estimated at 18,480 square miles.

CHAPTER II.

NARRATIVE OF 1855.

WALLA-WALLA TO THE BITTER ROOT VALLEY.

These explorations were made under the following circumstances: I had received the necessary instructions, and was clothed with proper authority to make treaties with the Indian tribes throughout the Territory of Washington; and I was also one of the commissioners for holding the Blackfeet council, which I had so long and so strenuously urged upon the government, and for which I had been preparing since 1853. James Doty, esq., the gentleman in charge of the winter post at Fort Benton, and who had crossed the country to Puget Sound in the fall of 1854, was available for service in this duty of treaties with the Indians. A most intelligent young man, Albert H. Roby, who, from a cook boy in 1853, had, in a year and a half, become an intelligent herder and woodsman, was desirous also of being engaged on this service. In January I sent Mr. Doty with a small party east of the Cascade mountains, to make the necessary arrangements for bringing the Indians together in council. A large quantity of goods were to be taken to the Walla-Walla, which was finally agreed upon as the council ground, at the instance of Kamiakin himself, who, in open council, said to Mr. Doty: "There is the place where, in ancient times, we held our councils with the neighboring tribes, and we will hold it there now." The goods for the council were taken to the Walla-Walla in keelboats; and this may be regarded as the commencement of a kind of navigation which, at the present time, has been succeeded by the running of sailing vessels carrying sixty tons freight, and by the launching of a steamer, which will soon ply from near the Dalles to Old Fort Walla-Walla, and probably some distance above. I also secured the services of a very intelligent, faithful, and appreciative man, Gustavus Sohon, a private of the 4th infantry, who, with Mr. Mullan the year previous, in the Bitter Root valley, had shown great taste as an artist, and ability to learn the Indian language, as well as facility in intercourse with the Indians. His services I secured, as interpreter, through the intervention of General Wool. I was well provided with barometers, forwarded to me by James Green, esq., of New York. Thus, in the month of May, 1855, I found myself in the Walla-Walla valley, with instructions to go to the Missouri, and with the means, by proper care and management of time, and a little hard work, to make a good examination of the country. My secretary, James Doty, esq., assisted me in the topography, and G. Sohon made the barometrical observations. This is not the occasion for me to dwell upon my operations in making treaties with the Indians. It is sufficient for me to say that they have been much misunderstood, and have many aspersions cast upon them. At a proper time I am prepared to vindicate every step of my course, and to satisfy all men of honor and disinterestedness that those treaties are entitled to the consideration and the confidence both of the government and the people of the country; but my present business is to give that narrative and account of my explorations which will throw light upon the character of the country. So, not making

any remarks about the great Walla-Walla council, both great in the fact that many tribes and large numbers of Indians were present, and great in the fact that it had a potential influence in preserving the peace of the country, we will move forward on our way to the waters of the Missouri.

On Saturday, June 16, we left our camp in the Walla-Walla valley at noon, moving over a delightful rolling country, well grassed and arable, to the waters of Dry creek, a tributary of the main Walla-Walla; and on June 17 we moved twenty miles over a remarkably fine grazing and wheat country, and camped on the Pa-at-ta-ta creek, a branch of the Touchet river.

The following points of to-day's journey are worthy of attention, in order to show that this region is not the barren desert it has been represented. In six and a half miles we crossed the Smahine creek of the Touchet, where there was good running water. In three and three-quarters miles further on we crossed the Kapyah creek of the Touchet, near its junction with the latter stream. There was pine in view in the valley of the Touchet, and the country was very beautiful and inviting. One mile further, on a small fork of the Touchet, several persons have taken claims in the vicinity, and four miles further on we struck the valley bottom of the Touchet. The descent was somewhat steep, but the bottom was wide, and there were pine and other trees in the valley. The whole country in view was well adapted to purposes of agriculture and stock raising. In three and a half miles beyond we crossed the Touchet, passed over a very low prairie divide, and in one and a half mile we came to the Pa-at-ta-ta, which we crossed, and encamped on the right bank. This stream falls into the Touchet one mile below where we first struck it.

Monday, June 18.—To-day we made twenty and a half miles, and camped on the right bank of the Pa-at-ta-ta, a tributary of the Tukanon. The following points are worthy of attention. The first ten and a half miles are over a very fertile and rolling country, bringing us to the crossing of the river. The bluffs on our course, or hills, bordering the Tukanon, are somewhat steep, and the valley itself not wide, but has a very fertile soil. There would be no difficulty in laying a wagon road through the depression of this valley, over which very heavy loads could be taken.

Leaving the Tukanon, we ascended the bluffs and passed over table-land of the same character as that of the first portion of our journey, and reached a Pat-tah-haha tributary of the Tukanon. This tributary furnishes a large amount of excellent land; its valley, as well as the table-land between it and the adjacent streams, is uniformly fertile, and at the present time covered with the most luxuriant grass. I will here remark, to guard against misconception, that it must not be inferred, when I speak of a country as being covered with excellent grass, that it is not an arable country, for I suppose it will be admitted that all arable countries ought to furnish grass of some kind. After travelling up this stream three miles, we came to rather a broad trail turning off, which, crossing Snake river, eighteen miles below the Red Wolf's ground, leads to the Cœur d'Aléne Mission and the Spokane country. Continuing up still further, we made our camp on its banks, in a beautiful grove of cotton-wood, with excellent grass. The day's journey has been delightful to all the members of my party, for it passed over a most beautiful prairie country, and the whole of it adapted to agriculture. In the valley of the Tukanon we found a very experienced and kind-hearted mountaineer, Louis Moragné, who, with his Flathead wife and six children, had gathered about him all the comforts of a

home. His eldest daughter was married to a very intelligent American, Henry Chase, a native of my own country, in the good old State of Massachusetts, and they now proposed to locate on the Touchet. Moragné left St. Louis in 1831, served some years in the employ of the American Fur Company, then went to the St. Mary's valley, but left there in consequence of difficulties with the Blackfeet. He is the owner of some fifty horses and many cattle. His potatoes were in blossom, and his wheat excellent. He had four acres in cultivation. He succeeded well in raising poultry, of which he had three or four dozen. The salmon is taken in the Tukanon river, and high up on the Blue mountains, at its source, are found elk and deer.

Tuesday, June 19.—We made to-day fifteen miles; crossed the Snake at the Red Wolf's ground, near the mouth of the Alpawaha creek, and camped on its north bank, the grass being entirely adequate to the sustenance of our animals, though not so luxuriant and abundant as at our previous camps. I will call attention to the following points of this day's journey. We continued up the creek, on which we camped, for two miles, at which point we left it, there being higher up the creek, directly in view, abundance of fine timber. Continuing on, in four and a half miles we reached the divide separating the waters of this tributary from the Alpahwah creek. This divide is, strictly speaking, scarcely a divide, for the whole country is table-land; but as far as we could judge, there not being water near to it, it was the highest point of our trail. Here we had a most excellent view of Pyramid Butte, of which we took the bearings, lying some distance north of Snake river. To the southeast the great gap of Snake river was in view. Three miles further on, gradually descending, we struck a branch of the Alpahwah, the water, however, being only in pools. In one mile we struck the main Alpahwah, which comes in from our right, and in four miles we reached its confluence with Snake river. Here, according to previous appointment, we met Lawyer, (the head chief of the Nez-Percés,) Red Wolf, and Timber Tail; and here I completed my arrangements in regard to the delegation which this powerful and friendly tribe were to send to the Blackfeet country. At the Red Wolf's ground was a fine field of corn, which promises a most luxuriant crop. I estimated the amount under cultivation at twenty acres. It was irrigated by the waters of the Alpahwah; it was tolerably well set out with fruit trees, and I observed with great pleasure that men were at work in this field, ploughing and taking care of their crops, as well as women and children. The corn planted only seven weeks since was about to silk out. From the appearance of the valley of the Alpahwah, I am satisfied that grapes would be a very profitable crop; and the whole country is exceedingly well adapted to grazing, and especially to wool-growing. I will refer the reader who is anxious to understand this country to the narrative of Lewis and Clark, both in regard to the character of the country and of the Indians. I have sometimes thought, while travelling, as I have to-day, over the route of Lewis and Clark, that it was a work of supererogation to do anything more than simply to quote their narrative. They speak of the soil of the country on this day's route as fertile. The Indians, too, are about as avaricious, with all their other good qualities, as they were in their day, as we had abundant reason to know from the difficulty with which we made a bargain to ferry our animals over Snake river.

We had for supper this evening a salmon; few salmon, however, are taken in this portion of Snake river. The water is deep, and the Indians never resort to seines or weirs. They take salmon in the night by floating down the river in a canoe and using a dip-net or a spear.

Higher up the Snake, and especially on the Koos-koos-kia tributary, the salmon is taken in great quantities, particularly at certain points on the road to the Flathead country.

At our camp we were visited by Lawyer, who gave us much additional information about his tribe and the character of the country. The Nez Percés country is exceedingly well adapted to grazing, and is for the most part a remarkably fine, arable country. There are very extensive fields of the kamas, and the Indians lay up large stores of that nutritious and delightful root.

Wednesday, June 20.—We moved twenty miles to-day and camped at a delightful spring, with abundant dry wood near by. The first two and a half miles we went down Snake river. An Indian camp was in sight, on the right bank of the river, one mile below, and another on the left bank of the river, two and a half miles below our camp. The Indians were getting up their horses to go out to the kamas fields northward of Snake river. We then moved up a small tributary of the Snake—the water, at the present time, at the lower portion of it, being simply in pools, or running short distances—and in four miles reached the table-land; water, wood, and grass being abundant the last two miles. And here I was astonished, not simply at the luxuriance of the grass, but the richness of the soil; and I will again remind the reader that it does not follow because the grass is luxuriant that the country is not arable. In a mile and a half we reached the divide separating the waters of the Snake from those of the Pelouse, which divide, so far as the eye could reach, is nearly parallel to the Snake, and about four miles from it. In two and a half miles we came to a long and narrow lake; fields of kamas in view for a long distance. There is running water in the lake, which, however, from time to time, sinks into the ground and rises again. Three and a half miles further we came again to running water, with luxuriant cotton-wood. This connects with the lake before referred to, and here is a most excellent camping place. In a mile and a half, again, wood and water. In two and a half miles we came to a low divide, and in two miles reached our camp. On our left we saw bands of Indians digging kamas, some three miles distant, who were afterward ascertained to be twelve lodges of Pelouses, under their chief Quillatose. I will again say, we have been astonished to-day at the luxuriance of the grass and the richness of the soil. The whole view presents to the eye a vast bed of flowers in all their varied beauty. The country is a rolling table-land, and the soil like that of the prairies of Illinois.

Thursday, June 21.—We moved to-day seventeen miles, and encamped at the right bank of the main Pelouse river. At our last night's camp the pines of the spurs of the Bitter Root were in view, extending to within a mile or a mile and half of us. We skirted along or passed through these pines during this day's journey. The whole country to the westward, as far as the eye could reach, was an open plain, the skies clear and the atmosphere transparent; I say again, the whole country was, apparently, exceedingly rich and luxuriant. I interrogated very closely my pack-master, Mr. Higgins, in reference to the character of the country westward, for he had crossed it on two different lines between our present trail and that from the mouth of the Pelouse; and he assured me that the country which my own eye saw to-day, and had seen yesterday, was precisely the same country as we found on the westward lines. Pyramid Butte was also in view to-day, as it had been yesterday. We took its bearings with a view of laying it down upon our map.

But to resume: in $3\frac{1}{4}$ miles we reached the extensive kamas grounds of the Nez Percés. Here were six hundred Nez Percés—men, women and children—gathering the kamas, with at least

two thousand horses. So abundant is this valuable and nutritious root, that it requires simply four days' labor for them to gather sufficient for their year's use. In $2\frac{1}{4}$ miles further on we struck the great Nez Percés trail, coming from Lasswai, a much larger and more used trail than the one we had followed from Red Wolf's ground. In one mile we came to water and cotton-wood; pines to the eastward of us, about a mile distant. In $3\frac{1}{2}$ miles we crossed a divide covered with pine. A most excellent camp is to be found one mile before reaching this divide. In $4\frac{1}{2}$ miles, passing over a rolling, well grassed, and arable country, we reached a second divide, also covered with pine; and in two miles more we made our camp on the Pelouse. Between the two divides a trail branches off to the Spokane country. The kamas grounds on our route are watered by several tributaries, which flow into the Teenat-pan-up branch of the Pelouse. Before descending into the valley of the Pelouse, I ascended a very high hill on the last divide, and westward of our trail, where I had a most distinct and interesting view of the sources of the Pelouse. So much was I impressed with it, that I directed Mr. Doty to carefully take notes and lay down the river on his map. It has its source in the main ridge of the Bitter Root, sixty or eighty miles distant from the hill where we observed it, and flows in nearly a straight course through a valley some twenty miles wide, bearing north 77° east, through a country densely timbered with pine. There is probably a pass to the St Mary's valley, by the line of the Pelouse. I will remark, again, that the country in this day's travel has been of the same general character as that of yesterday. The bottom land of the Pelouse has great resources. It is very heavily timbered with pine, with but very little underbrush; and the country throughout is open, the grazing being most admirable. We had a view down the Pelouse for some thirty or forty miles, and the timber was apparently as large and abundant at the lower end of the valley, as at our present camp. Many trees are to be seen three and four feet through, with a proportionate height.

Friday June 22.—We made to-day eighteen miles, and camped in the celebrated Kamas prairie of the Cœur d'Aléne, and on the river of the same name. In seven miles we came to a spring with abundant wood, one mile before reaching which, the trail joined us which leaves the northern tributary of the Tukanon, as stated in the journal of June 18. In five miles further we crossed a divide covered with pine; and two miles further on, came to a small stream which afforded a good camping place. In two miles further, crossed a low divide, and in half a mile came to running water, affording a good camp. In half a mile further we came to a delightful spring surrounded by a grove of cotton-wood, with pine near at hand; and in one mile came to running water on the Cœur d'Aléne kamas grounds. At these kamas grounds there were twenty-five lodges of Cœur d'Alénes, and about 250 Indians, who visited our camp and gave information about the Cœur d'Aléne Indians and the country. The chief and his principal men agreed to meet me at the mission. Towards evening we were visited by Sljotze, one of the Pelouse chiefs, and some twenty of his men. His camp consisted of eleven lodges and 137 souls. Four lodges more were down the Pelouse, and ten men, women, and children were at the falls of the Pelouse. In conversation, Sljotze expressed his own and his people's satisfaction with the treaty. They regarded Kamiakin as the head chief of the Yakima nation, and the Pelouses as a tribe of that nation.

Saturday, June 23.—To-day we moved $18\frac{1}{2}$ miles, and camped at the cuts of the Cœur d'Aléne lake. The first four miles took us over a rolling country to a very large spring surrounded by



J. Bien N. Y. lith.

SOURCE OF THE PALOUSE.

cotton-wood, on the left of our trail; three miles further we passed by a spring on our right; in two miles crossed the divide between the waters of the Cœur d'Aléne prairie and the Cœur d'Aléne lake and river; in six and a half miles we came to a limpid and abundant stream of water near the foot of a low divide, which was very heavily wooded. In a mile and a half we struck the lake, passing down a rather steep hill; and continuing along the borders of the lake a mile and a half more, we crossed what is known as the Guts of the Lake, and made an excellent camp on the other side. And here the good effects of the arrangements we made last evening with the Indians showed themselves. The chiefs and principal men, who had agreed to meet me at the Mission, reached the crossing before my party did, and had the canoes in readiness to take us over.

The narrative of these last four days travel shows how extraordinarily well watered the country is west of the spurs of the Bitter Root mountains. I will state again, having crossed this great plain of the Columbia from the Chemakane Mission north of the Spokane to the mouth of the Pelouse, that the difference in the character of the country on these two lines is most extraordinary. A large portion of the country, from the Chemakane Mission to the mouth of the Pelouse, is arable; it is generally well grassed. There is no deficiency of wood for camps, yet occasionally the basaltic formations crop out of the ground, at which points the country is sterile and uncultivable. But under the spurs of the Bitter Root the whole country is arable, the soil as rich as the best prairies of Minnesota, and every convenience for the house and the farm at hand; water, wood for fires, and timber for building.

Sunday, June 24.—The St. Joseph's river, on which we camped, is larger apparently than the Cœur d'Aléne. For several miles it has a very sluggish current and is quite deep. It furnishes unquestionably a route to cross from the Bitter Root mountains to the St. Mary's valley, which has been used by Father De Smet and others of the Jesuit missionaries. Father Ravili, however, has not been able to give much information about the river. But to resume our day's journey: we made fifteen miles, and I put the main party into camp on the Cœur d'Aléne river, and continued on myself to the Mission. In a mile and a quarter we crossed the St. Joseph's river, keeping up the right bank of which for three miles brought us in sight of the former Mission, half a mile from the St. Joseph's, on a most beautiful point of land, with springs of water and abundant wood. The country here was exceedingly well grassed; although somewhat rolling it furnishes every advantage for agriculture. Continuing on for five miles further, over the rolling country between the St. Joseph's and the Cœur d'Aléne, we reached the lake, and in five miles more came to the lower crossing of the Cœur d'Aléne river and encamped on its right bank. On my way to the camp I learned that Colonel Crosby, whom I had sent to Colville on business connected with the treaties, had anticipated me a day at the Mission, and he had the forethought and precaution to have boats sent to the place where I camped my main party, in order to relieve the animals, who had a somewhat boggy road to pass over to reach the Mission to-morrow. With Mr. Doty and Mr. Sohon I rode to the Mission that evening, and met two of my old voyageurs, Antoine Plant and Camille, who had with them specimens of gold which they had found on Clark's Fork, some forty miles above its mouth. I learned that an assistant of Dr. Evans, Girardin, had been sent down on an express to Mr. MacTarish, chief factor at Vancouver, with information about the gold, and to get instructions

and confer in regard to the measures which should be taken to secure to the Crown and the company the mineral wealth north of our parallel.

We were received at the Mission in the most cordial and hospitable manner, and remained there the next day. To show something of the privations which the missionaries have to undergo, I will remark that Father Ravili, in his recent trip from the Dalles, had the assistance of only two Indians and an Indian boy in bringing up a train of twenty-two pack animals. He was obliged to see personally to the packing of each one of his animals, doing most of the manual labor himself, and could not get off (though he commenced at early dawn) until towards ten o'clock in the morning.

Tuesday, June 26.—Before starting—for I remained at the mission until about two o'clock to-day—I had a conference with the Indians in regard to their own special treaty arrangements, and as to sending a delegation to the Blackfeet treaty. It will be sufficient to state here that the conference was entirely satisfactory to all parties; and bidding adieu to our hospitable host we moved eleven miles to a large prairie, where my party encamped in October, 1853. The road was for the most part very easy to-day, except that in coming into the prairie there were some wet places. The grass is uniformly good, and although the immediate valley of the Cœur d'Aléne is not wide in any place, yet the hills slope back very gently, making it an open country. A rain came on about midnight, and I remained in camp here the two following days. On Wednesday a Flathead joined our camp, from the Bitter Root valley, and gave us information in regard to the several tribes of that nation. Everything was quiet, and all were looking forward to the council.

Friday, June 29.—This morning was clear and delightful; but the rains of the two previous days had made portions of the road muddy and the crossings of the streams difficult. We met the superior of the Missions of this country and two other gentlemen of the party returning from the Bitter Root valley, where they had gone to inspect the Upper Pend d'Oreille Mission. The following is the itinerary of to-day's journey. We made in all thirteen miles. The first half mile we crossed two sloughs, and in half a mile further we reached the largest cedar that I ever saw in the Territory, some twenty feet in diameter. Continuing up the bottom half a mile further, we take a side hill, which we pursue for three-eighths of a mile; crossing then a small stream, and sometimes on side hills and sometimes in the valley, we at length reached camp. Without going into details of this route with more particularity, I will observe that there are a number of good camps, with excellent grass; and there was everywhere plenty of firewood. We crossed the river sixteen times in to-day's journey. The ascent of the valley was very gradual, in almost a straight direction, presenting no sharp curvatures and no obstacles either to the construction of a wagon or a railroad; and the river crossings would be no obstacle to a railroad, because the water does not rise more than three or four feet above its present level.

Saturday, June 30.—We made fourteen miles to-day and camped on a little tributary of the Cœur d'Aléne river, about one mile above its junction with the latter stream. In five and one-half miles from camp we reached the foot of the mountain which is referred to in my trip of 1853; but I resolved to keep up the river itself. I have already referred to this route as having been pursued by Lieutenant Mullan last year, who described it as exceedingly eligible either for a wagon road or for moving with pack animals. His general account of the route

was exceedingly accurate, and the trail presented more advantages than I anticipated. After leaving the foot of the mountain a mile and a half, we made our seventh crossing of the Cœur d'Aléne to-day, in a cedar swamp, easy in this season of the year, but very muddy soon after the melting of the snows, where considerable work would be required for a wagon road. For the remaining distance to camp, we crossed several streams of water, occasionally keeping on side hills or over rolling ground; but no obstacle of a serious character presented itself for any structure which the wants of the people might require. The hills occasionally have a steep pitch, but are low; there is generally very fine grass on our route, and there was abundant water; and here we came to fine limestone, which was scattered about in blocks. Plenty of fine timber in the valley of the Cœur d'Aléne in view to-day. Nor will there be any difficulty on account of freshets. In this portion of the stream the highest water is only about four or five feet above its present level.

On reaching camp this evening Mr. Doty, Mr. Schon, and myself, followed down the little stream on which we were to its junction with the Cœur d'Aléne. There I took a barometrical observation, and observed the river carefully. I will observe that on starting yesterday morning I sent ahead a small pioneer party, consisting of two of my best voyageurs, to open the road, which was somewhat obstructed by fallen timber. One of the peculiarities of travelling in a wooded region is, that to get along comfortably with a pack train you must send a party ahead to clear the track of the fallen timber. The two men who were put upon this duty kept the track clear and were not joined by the train until they reached camp.

Sunday, July 1.—To-day we crossed the mountain and camped on the St. Regis de Borgia, our day's journey being fifteen miles. Starting from camp, we moved three miles over the same rolling country as described in yesterday's journal. The grass was very plentiful and luxuriant, and water in clear and limpid streams every mile or two until we reached, four miles further, a cedar swamp on the banks of the Cœur d'Aléne river, through which we passed, and occasionally pursuing our course over very low side hills, coming to the river, from time to time, through a country wooded, open, and arable, we finally reached the crossing of the Cœur d'Aléne, and began the ascent of the mountain. Looking up the valley of the Cœur d'Aléne from this point of the crossing, which was seven miles from our camp of last night, I observed that the valley was quite wide and open, and from what I had observed of the stream on the other side two years since, it seemed to me probable that there would be found no difficulty here in tunneling for a railroad. We had, in the course of the morning, taken quite a number of barometrical observations, and we continued these observations until we reached our evening's camp. The western ascent of the mountain was somewhat steep. Although I carefully observed the whole country and found that, as regards a wagon road, I could lay one on gentler slopes than the slopes on the great national highway between Jalapa and Perote. This hill was 5,000 feet above the sea, and on its top and sides was a very heavy growth of timber. There was coarse and luxuriant grass over the mountain side—not choice food for animals, but which they eat very readily in the winter. The eastern descent of the mountain was more easy than the western; but the valley of the St. Regis, in its upper portions, was more narrow and less practicable than that of the Cœur d'Aléne. I found, however, that in every portion of this valley there was room enough to lay a wagon road or a railroad; to form embankments and to make excavations without filling up the valley or obstructing the course of the water—a

consequence to be very much guarded against in narrow mountain valleys. In examining this and other valleys I have sometimes seen that assistant walls would have to be used instead of embankments of earth, there not being room for the latter arrangement. On reaching camp I found a Cœur d'Aléne express, whom I despatched some days since to the Bitter Root valley with instructions to Mr. Adams in regard to the Flathead council. Mr. A. informs me that the Indians are all ready to assemble; that he will have his camp established six miles below Hell-Gate; that everything is quiet in the Indian country, and that the Indians are all full of the Blackfoot council.

Monday, July 2.—To-day I moved sixteen miles and a half, and made a most excellent camp, with grass, wood, and water, as good as one could desire. The great feature of to-day's travel was the constant crossing of the St. Regis de Borgia river. I took the precaution to note every crossing, and to observe and record the time occupied in moving from crossing to crossing, and was able, therefore, to estimate the distances with considerable accuracy. All down the valley are little spots of grass; it is, for the most part, wooded, but furnishes camping grounds for small parties. The difficulty in moving with a large party would be, that the animals would scatter in the woods a good deal; they would have no difficulty in getting plenty of grass to eat, but it would be somewhat troublesome to hunt them up and have them in readiness in the morning. This, I say, is the main difficulty of moving with a large party. Were the woods burned on a part of this route and grass seed sown, it would be as fine a route as I ever saw. Without going into very careful details, I will state that we crossed the St. Regis de Borgia thirty-nine times to-day, in no case, however, going over side hills to an extent to make a perceptible rise in our route. The low bluffs and hills immediately bordering the valley were not more than twenty or thirty feet high, and in every case they run back gently, covered with heavy pine, spruce, and larch, with occasionally a cedar. All the country adjacent to the valley is rich and arable. The heavy forest trees and cotton-wood on the streams furnish the most abundant material for the building of little settlements, and for railroad construction. I will here state that when I crossed, in 1853, my health was exceedingly delicate, and I was not able to make that close and careful observation of the minute points of the country that I have been able to do on this present trip. Now, in regard to the crossing of the river, they were in every case easy fords. The stream was in no case more than from two to two and a half feet deep, and we made thirty-nine crossings without wetting a pack. The banks of the river were generally from four to twelve feet above the present water level, which is only three or four feet above the highest water. Throughout the day's journey excavations and embankments would be very moderate. There was a great quantity of limestone on the route to-day, as well as yesterday. Speaking of the building materials—when I crossed over the mountain route in 1853 and ascended the highest peak, which my friend Doty the subsequent year named for myself, I saw vast quantities of limestone. Some three or four mountain peaks within twenty miles of me were, apparently, masses of limestone, and from the appearances of the out-croppings of that peak on the route, I am satisfied that the finest quarries of limestone and marble will be found; but the detailed examination of such matters belonged to the geologist, and I had not time to wait a day to make a minute examination.

I observed to-day that in the crossing of the St. Regis it would not be necessary in any case to resort to bridges requiring piers. Many of the crossings, however, would have to be very

oblique to the course of the stream, in order to preserve the greatest possible directness in the line of the road and avoid sharp curvature; yet in every case it would simply require abutments and a single arch or truss. There would be a good deal of culvert masonry on the route to-day; but in most cases dry walls will answer every purpose, and only occasionally will walls of masonry have to be resorted to for culvert work. I examined the river, also, in regard to drift, and found very little on its banks, another fact showing how light are the freshets of the stream, for it must be observed that occasionally there occurred on the immediate line of the stream heavy timber, with thick underbrush, presenting the only difficulty we had in moving with pack animals, and the cause of our crossing the stream so often.

Tuesday, July 3.—We made sixteen miles to-day, and camped on the main Bitter Root. Although I had not in my train quite one hundred animals, yet they got scattered somewhat in the wood, and we were rather a long time in collecting them. But I saw that they were well filled, and in a condition to make a good day's march. We continued down the river, passing over the same character of country as yesterday. Luxuriant grass occurred every mile or two. Leaving it near a point where there was a very fine bed of limestone, and continuing up a small tributary which flows in from the left, we reached the beautiful prairie where, in 1853, I made my noon halt and got some fine venison from a little party of Indians, as well as a salmon trout. We now continued on, passing over a high hill, from whose top we got an exceedingly good view of the surrounding country. We could discern the general course of the valley of the St. Regis de Borgia, and the several connecting tributary valleys, each furnishing its water to the main stream. Our course thence to the Bitter Root river was mostly through an open, wooded country, in some cases very well grassed, the whole of the country arable, and the hills gently sloping; the country not being as broken as one would have anticipated. We made our camp one mile below the mouth of the St. Regis de Borgia, finding the Bitter Root river not fordable; and it was obvious that it would be necessary for us to construct rafts the following day in order to cross it. The ford at this point is one requiring care to take a train over at the very lowest stage of the water, which is in September and October. Animals should be led over this ford, for it is in a very oblique line in relation to the general course of the river. Entering the ford from the west side you continue well down the stream, following a shoal or sand bar; if you go a little to the right or left you get into deep water; but in the fall of the year the water would simply come up to the packs. The next morning all the men were at work constructing rafts; and with Mr. Doty and Gustavus Schon I went to the mouth of the St. Regis to make observations for altitude and examine the banks of the stream. The country here, for a mile each side of the river, was low, not more than from one to three or four feet above the highest water of the spring freshets. Occasionally I observed a slight depression in the ground, where the water would rise some few inches; and I saw that it allowed of laying a railroad line down the valley, making such a crossing of the Bitter Root as would give good lines of direction and avoid sharp curvatures.

Wednesday, July 4.—We were engaged this day in making the crossing. Three rafts were constructed. I went over on the last raft myself with Mr. Higgins, our packmaster, my son, and some of the best voyageurs of the party; and it was with great difficulty that we made the other side, for our raft was rather unwieldy; we did not make a good start, and came very near being swept down by the current. But we succeeded in making the other shore, established

our camp back on the bluffs, and had everything prepared to move in the morning. In the vicinity of our camp the country seems to consist of slightly rolling table-lands, and as far as I could judge, from the appearance of the country, and from the information which I could gain from the Indians, I am satisfied that the country generally between the Bitter Root river and the Flathead river, whose junction forms Clark's Fork, is mostly cultivable table-land. I paid particular attention to the forest growth, and I bore in mind our Puget Sound experience, which had established the fact that the timber lands, as a general thing, were much superior to the prairie lands. When I first went to the Puget Sound country in 1853 that fact was not acknowledged, but the popular impression was that the timber lands were worthless, except for the timber. In 1855 there had been experience of crops on timber land, which established conclusively the fact that they were our most valuable lands for agricultural purposes.

Thursday, July 5.—My camp of last night was two and a half miles below the mouth of the Saint Regis de Borgia. We did not get off until eleven o'clock, and travelling seven hours we made our camp on a small creek watering a rich and large prairie, with the most luxuriant grass we had seen since leaving the great plain of the Columbia. On arriving opposite the St. Regis de Borgia I found that a railroad or wagon road down that stream should take the right or southern bank of the St. Regis and thence cross the Bitter Root. The banks of the Bitter Root, on both sides, are exceedingly favorable to such a crossing. They are only six feet above the present water level on the left bank, and eight feet on the right bank. The highest water is five feet *above* the present level, and the lowest water is about three feet *below* the present level; so the greatest rise and fall of this stream at the mouth of the St. Regis is eight feet. The river is 150 yards wide, which width is preserved throughout to-day's route. The regimen of the river is very uniform, the banks not abraded in the slightest, and, with one exception, hereafter to be noticed, no shelving of the banks has occurred. I noticed particularly the growth of forest trees on the side hills throughout to-day's and every day's march on my present journey; and from the appearance of the forest trees I saw that for at least one hundred years there had not been a shelving on the route. The Bitter Root river, like all mountain streams, has a somewhat sinuous course; yet the smallest curve required in a railroad line through its valley to the mouth of the St. Regis de Borgia has a radius of two thousand feet.

It may be well to give the details of to-day's journey with some little particularity. From opposite the mouth of the St. Regis for a mile and a half the road follows a plateau some eight to twelve feet above the present water level; then for three-quarters of a mile it runs along side hills, generally low, not requiring much excavation and embankment, and with gentle curvatures. I observed at this point that the engineer had the choice of routes; he could either follow along the river bank, or he could lay his course somewhat inland; and it is only by careful location that the relative advantages of the two could be determined. Then for three-eighths of a mile you pass through a prairie with gentle curves; one-eighth of a mile side hill work again, but very slight; at the end of this distance there is a point of land running to the river, which must be cut through. For one and seven-eighths mile the route is on a plateau slightly undulating, to the extent that it is sometimes ten and again it is forty feet above the river level, but excavations and embankments slight. The curves are so gentle that for this portion of the distance the line is equivalent to a straight line. At this point

there is a good crossing of the river, but it is not essential to make the crossing; on the contrary, the road should keep along the present bank. For one and three-quarters mile more we follow a plateau from ten to twenty feet above the water level. At the end of this distance are two spurs which come near to the river, affording room, however, for a road, with very moderate excavations and embankments. For one mile more we come on a plateau twenty feet above the river level, very uniform in its character and in a gentle re-entering. The excavations and embankments are very moderate here. For one mile further still we keep on the bank of the river. Hills come down near the river, but there is no rock excavation, and excavation and embankment are both moderate. For three-quarters of a mile more we still keep on the river bank, when we come to the only difficulty on the road. Very high, steep bluffs stretch along the river for 350 yards. No trees grow on the sides of the bluffs. It is impossible to lay along this bluff either a wagon road or a railroad by excavations of earth. The route must make this portion of the river by a peculiar construction hereafter to be described, or you must lay the course well back. From what I could see of the country I thought there would be no difficulty in doing so, but I cannot speak positively as to that. At the end of these river bluffs, that is, at 350 yards, I observed that the banks were very firmly fixed, both from the appearance of the grass and from here and there a tree growing. No change could have occurred in them for many years, probably not for a hundred years, and the structure to be resorted to is the following: There will be no difficulty in building heavy abutments and in throwing an arch along the line of the river from the northern to the southern end of this bluff, and therefore a heavy bridge structure along the bank of the river will enable you to pass these bluffs. It would require but a single arch; so whenever the bank shelves again it will pass under the arch, and it may do so repeatedly without interfering at all with the structure. In one quarter of a mile from the end of these bluffs we come to a creek which will have to be bridged, and in a quarter of a mile further we come to the plateau. This last half mile will require some side cutting. We then continue for three and three-quarters miles over an open prairie, with a somewhat hard soil, better adapted to grazing than farming, and which can easily be adapted to grades. At the end of this distance is a fine mountain stream which must be bridged. The whole distance is in a large re-entering. An almost straight line can be laid all through this distance. The prairie is characterized by plateaus, which run obliquely to the river, and which will have to be handled with some little care in order to reduce grades, as well as excavations and embankments. I will here observe, speaking of these plateaus, that in a careful examination of the country, simply with reference as to its practicability for a railroad line, they hardly come into the account at all; they are simply matters of detail; and I have gone into these details with great particularity on the present occasion, because in 1853 I reported in regard to this route difficulties which, on a review of the route in 1855, I found to be much exaggerated. In one mile there is a slight change of level, for the plateau rises twenty feet, but the road should still keep on the river side. For one mile further there will be some side cutting for half the distance. In three and a half miles, gaining gently from the last distance the prairie of our camp, we lay the road in a straight course. Here is a fine prairie of two to three thousand acres of excellent grass and watered by several streams. Our route to-day enabled us to view the opposite side of the river. Half a mile before reaching camp a stream flows into the Bitter Root from the

opposite side, and three and a half miles before reaching camp a larger stream flows in. The first stream is about one-half and the latter stream about three-fourths the size of the St. Regis de Borgia. I will observe that just after leaving camp this morning we met a Flathead Indian, with a note from Mr. Adams, saying that the Indians were patiently waiting for my arrival. The Indian was sent back with a note saying that I would be there the next day.

Friday, July 6.—Before entering upon the details of this day's journey I will state that, on leaving my camp on the right bank of the Bitter Root river, I pushed forward with a small party, leaving our packmaster, Higgins, in charge of the supply train to come up a day later than myself. It was always a favorite plan with me to have a trustworthy man in charge of the train and arrivals, and let him have his own way, under general instructions, so as to leave me free to devote my whole time to the examination of the country. Starting from our morning's camp, three-quarters of a mile takes us to the end of the plateau, where the river can be crossed to a plateau on the opposite side; but continuing on this side one-eighth of a mile further involves side hill work, with a curvature of fifteen hundred feet. For a mile and one-eighth further on the plateau is from thirty to seventy feet above the water level of the Bitter Root; but a grade of forty feet could be adjusted to the ground without heavy embankment. For two miles more the plateau is still generally followed. Two bridges in this distance will be required to cross mountain streams. The excavation and embankment for this distance will average about six feet. Five-eighths of a mile further on we come to somewhat difficult work; the banks are bluff, presenting steep natural rock embankments, and making it necessary to take the railroad line close to the water's edge. At two points, in order to avoid sharp curvature, we must enter somewhat upon the river itself; but there will be no difficulty in the structure, as the current is not rapid, and it will be simply a case of sustaining walls. At the end of this distance it will be necessary to gain ground ahead by a somewhat heavy excavation and embankment. The next five and a half miles takes us across a bend formed by a spur running northwest and southeast. Here we have a choice of routes. We can either lay our course back from the river, or we can pursue the river bank itself. There will be no tunneling in this distance on either line; but, looking to the interior line, we cross a spur four miles from the beginning of this section, which will involve a somewhat heavy earth excavation, in order to adjust reasonable grades to the ground. I will refer especially to the map to show the general character of this section. I was pleased, in passing over it, to find it well watered, well grassed, and the great body of it arable. The woods are open and the trees somewhat large. The grade will not exceed thirty feet to the mile. From the best information that I could get of this whole section, I am of opinion that the railroad line should keep on the river bank. For two miles more we continue on the same general plateau, which, at points, somewhat narrows, but never gets an elevation exceeding fifty or sixty feet above the river. Good grass is found along this distance. Looking to my narrative of 1853, it will be found that half a mile before reaching the end of this distance is a small streamlet, which sinks into the plateau, where I camped, on my return trip of this year, November 15 and 16, and where I camped October 7 and 8, 1853. At this point, looking eastward, the trail leaves the river, and, passing over hills, continues some eight miles before reaching the river again. Here is the point where the railroad line must first cross the river. I had examined, in the most careful and considerate manner, the whole course of the river from the mouth of the St. Regis de Borgia to this point, and we get

the best grades, the most reduced excavations and embankments, and in all respects have the best railroad line, by keeping on the eastern or right bank of the Bitter Root river to this point. We must now cross the river, which is here two hundred feet wide, with banks about forty feet high. The ground is remarkably well adapted to a bridge crossing. The timber is of the most superior quality for all purposes of bridge construction. Keeping on the western bank of the river, there are no difficulties whatever in the construction of a railroad; easy grades can be adapted to the ground. In four and a half miles a marsh is met with, but that will require only embankments of twenty feet. At the end of this distance—six miles—the river, if necessary, could be crossed again to its right bank, but, after careful examination of both these shores, I am satisfied that the crossing should be made further on. So, for a mile and a half, we keep our railroad line on the left or western bank of the Bitter Root river, on which distance the first thousand feet will be large and extensive rock excavation; the remaining distance is a plateau, under a side hill. At the end of this distance the railroad line must recross the river. The banks are low, the distance across not exceeding two hundred yards. There will be no difficulty in adjusting curvature to the ground, but on either bank there will be considerable rock excavation, and a still heavier excavation and embankment. In seven and one-half miles after the crossing the country is such that we have to make a passage from one plateau to another forty feet below it, which will require a heavy embankment and a bridge. In a mile further on we come to, also, a heavy embankment of forty feet; and for three-quarters of a mile we have to maintain this embankment and build two bridges. One of these will be a considerable bridge, perhaps one hundred and fifty yards long. We then pass a plateau, where will be involved one deep cut, with some rock cutting. Thence, to camp, seven and a half miles further on we pass over a country easily adapted to grades, with very moderate excavations, the grade not exceeding twenty feet to the mile. Along the whole course of the Bitter Root there will be more or less curvature, and in the location there must be the very best judgment used, so as to make the best use of all the circumstances of the ground; but, on the most careful examination of all the localities, I am satisfied that the grades will be moderate, the excavations and embankments will be small, the bridge crossings will be light structures, and that a most feasible railroad line can be taken down the Bitter Root to the mouth of the St. Regis de Borgia.

Saturday, July 7.—Before we left camp this morning the special agent of the Flatheads, Mr. Adams, joined us, looking in fine health and spirits, showing the good effects of a long sojourn in the wilderness to develop the physical strength of the species. He informed me very thoroughly about all the arrangements he had made for the council with the Flathead nation. We then moved camp, and in three miles met the chiefs and braves of the Kootenay, Pend d'Oreille, and Flathead tribes, who received us in the most cordial manner, and with salutes of musketry accompanied us to their own camp on a little tributary of the Bitter Root, where, after having stayed for some hours and made a careful examination of their condition, meeting all our old friends, and establishing the most cordial *entente* between them and our people, we made our own camp on the Bitter Root, some seven miles from our camp of last night. I will defer to a subsequent occasion any remarks about a continuation of the railroad line.

This is not the place to go into the details of the Flathead treaty, although my duties as an observer of the country were strictly incidental to those as commissioner of the government in making treaties with the Indian tribes. To this latter duty my attention was devotedly

given for the eleven following days, though I did not neglect every possible test which my opportunities enabled me to apply to the physical geography and development of our knowledge of the country. Thus I had all our barometers brought down from Fort Owen. I had daily observations made of the barometer and thermometer, with a view of ascertaining the altitude of our camp above the waters of the ocean, and of making such comparisons between our various instruments that I could rely upon our field observations hereafter. I had lost all the observations of 1853. They had been confided to the charge of Lieutenant Donelson, who, making the best disposition that he could to insure their safely getting on to New York, lost them on the Isthmus. This tended to throw doubt upon my whole work as regarded the altitude of the country, and I desired to vindicate my work of 1853 by my observations in 1855. I trust the time will come when my treaty operations of 1855—the most extensive operations ever undertaken and carried out in these latter days of our history—I repeat, I trust the time will come when I shall be able to vindicate *them*, and show that they were wise and proper, and that they accomplished a great end. They have been very much criticised and very much abused; but I have always felt that history will do those operations justice. I have not been impatient as to time, but have been willing that my vindication should come at the end of a term of years. Let short-minded men denounce and criticise ignorantly and injuriously, and let time show that the government made no mistake in the man whom it placed in the great field of duty as its commissioner to make treaties with the Indian tribes. So, leaving all these things to the proper occasion, and turning our minds simply to the physical geography of this country, we will now part with our Flathead friends, with whom we had made a treaty of peace and cession—every man pleased and every man satisfied; and this satisfaction has continued until this present hour. We left them on Wednesday, July 18, to move forward to Fort Benton.

BITTER ROOT VALLEY TO FORT BENTON, AND RETURN TO OLYMPIA.

Moving from our camp of July 6, we this day (July 18) continued over the Hell-Gate Ronde, and encamped a little above the junction of the Big Blackfoot and the Hell-Gate rivers, on the right bank of the former stream. The details of this day's journey, from our camp on the Bitter Root, where we held our treaty with the Flatheads, are as follows: We moved across the Hell-Gate Ronde for six miles, and came to a small stream lined with service bushes; at this point is the ford of the Hell-Gate that takes you to Fort Owen. We then proceed up the valley of the Hell-Gate two miles, in a valley from one to two miles wide, with good grass, and in four miles we make our camp. The railroad line throughout this distance may be laid very nearly in a straight line to the Hell-Gate Ronde, the grades easily adapted to the ground. The highest rise of the river, either the Bitter Root or the Hell-Gate, is only about five feet above the present level, and the present height is less than one foot above the lowest water. I organized an express service on these treaty operations, which it may be well for me to refer to. At Fort Walla-Walla, on concluding the treaty with the Nez Percés, the Yakimas, the Cayuses, and the Walla-Wallas, I despatched Pearson to Olympia with reports to the Indian commissioner, and with official letters to the officers of the Indian department in the Territory. Pearson, on his return, reached the Bitter Root valley in season to take back, on the morning of July 18, full reports of the Flathead council to the Indian commissioner and the officers

under my direction. I suppose there has scarcely ever been a man in the service of the government who exceeded Pearson as an express man. Hardy, intelligent, bold, and resolute, having a great diversity of experience, which had made him acquainted with all the relations between Indians and white men from the borders of Texas to the 49th parallel, which enabled him to know best how to move, whether under the southern tropics or in the winter snows of the north; this year he did for the service under my supervision a labor which requires from me at the present time the most ample acknowledgment.

Thursday, July 19.—I desire not to go too much into detail in regard to a route which I have already reported upon, for I am now upon the trail which I followed in 1853; but leaving our camp of this morning our route was through what is known as the Hell-Gate or Blackfoot cañon, which continues for some 18 miles. This is not a cañon, properly speaking; there are no perpendicular bluffs; there are no serious difficulties in the way of a wagon road or a railroad, but the course of the river is sinuous; points project down to the river from either side, and the very careful examination which I made of the course of the river to day developed this feature in the character of the route; wherever a point came down on one side of the stream, there was there to be found a prairie on the other side. So, by several crossings of the river, or from time to time cutting into points of rocks, there will be no trouble in laying a railroad line without the use of a single enrockment or sustaining wall. I regretted that, after passing up from our camp six miles, I was not able to cross the river and examine carefully and personally a route on its southern bank leading through the Kamas prairie of the Flatheads. This route was pursued by my secretary, Mr. Doty, in 1854, and at the end of this day's journey he assured me that it was a much more favorable route than the one I pursued to-day, and which I pursued in 1853, whether as regards the construction of a wagon road or a railroad. In my narratives of 1853 and 1854 I have quoted sufficient from the remarks of Mr. Doty and Lieutenant Saxton to show the general character of this Kamas prairie field of the Flatheads. Therefore, in any future examination of location the two sides of the river will have to be very carefully examined; and I refer to it on this occasion simply with a view of calling attention to the fact that there are probably practicable lines both north and south of the Blackfoot. Looking to my notes of this day's journey I find that they are in exceeding detail, but I do not deem it necessary to go into any further elaboration of the character of this route. Occasionally the trail led us back from the river, and we found abundant streams of water and large forest trees, but the woods were of an open character, with good grass and arable land; and, finally, on emerging from the cañon we came to a most delightful camp in the valley of the Blackfoot. Here we put to work our Pend d'Oreille guide and hunter, who had been placed at our disposal by Alexander, head chief of the Pend d'Oreilles, and who in less than an hour had for our supper the finest string of trout I ever saw in the mountains. Not content with which, however, he soon started out again; we soon heard the report of his gun, and half an hour afterwards he brought into camp an elk weighing at least seven hundred pounds. This elk he killed in a somewhat narrow fringe of forest trees, interspersed between the Kamas prairie of the Flatheads and the waters of the Blackfoot.

Friday, July 20.—We made an early start this morning and continued up the valley of the Blackfoot. This valley for the most part is wide and open. The spurs separating it from the Hell-Gate valley on the south, and which separate on the north the various tributaries flowing

into the Blackfoot, are all of them somewhat low and gentle in their character. Indeed, when we come carefully to examine the fringe of cotton-wood on the banks of the Big Blackfoot itself, and to look beyond those trees to the neighboring spurs and slopes, we found that we were in the midst, generally speaking, of a prairie country. Most of the slopes between the Blackfoot and the Hell-Gate, and between the several tributaries of the Blackfoot itself, were grassy slopes of a gently rolling character; large portions of the soil arable. As I moved up the valley I began to realize the fidelity of the description of Lewis and Clark, who speak of this whole prairie of the Blackfoot, over which our day's journey led to-day, as the Prairie of the Knobs. On a map of the usual scale, these knobs or little ridges were too small to be represented, the slightest mark on the map would exaggerate them. In short, I will speak of our day's journey to day, of some 32 miles, as being through one of the most delightful, well watered, and well grassed countries I have ever seen; and here must be a fine place for settlements. We camped this evening near the mouth of the Salmon Creek river, on the banks of the Big Blackfoot; and our guide again to-night regaled us with the beautiful mountain trout of this country. Looking to our day's journey of yesterday and to-day, I began to see how much this country was a prairie country; how open the forest land was; how generally arable it was; and I was able to realize the truth of the description of the Jesuit missionaries who had preceded us.

The following itinerary of this day's journey is worthy of mention. The first seven miles is through a prairie valley, generally from three to four miles wide, at the end of which distance we come to the trail already referred to, leading to the Kamas prairie on the left bank of the Big Blackfoot. Here is a low spur, closing the view from the river and running in a northeast and southwest direction. The next mile and a quarter is over a low ridge and through open wood, which may be considered a portion of the Blackfoot valley. In a mile and a half we come to a stream of running water, the country very well grassed on each bank, and in three-quarters of a mile further to a fork of the Blackfoot, with a wide open prairie re-entering running well to the north. And here is the point where Mr. Tinkham left the Big Blackfoot valley, in September, 1853, to make the cut-off to the Jocko. In $2\frac{1}{2}$ miles further on we strike the Big Blackfoot. This particular valley narrows to a quarter of a mile, but the general valley of the river is wide and open. The immediate valley of the Blackfoot is generally about six to ten feet above the water level. Going on $2\frac{1}{4}$ miles we cross a considerable stream coming from the left, and in two miles strike the Blackfoot again. Here, also, the Blackfoot winds through an open, low-banked valley, the width of the undulating or knob prairie of this general valley being at this point from eight to ten miles. For the next six miles the route passes through the knobby prairie already described. Throughout the valley of the Big Blackfoot, in this portion of its course, no sharp curve or abrupt descents will be required, and the immediate valley is quite wide and uniform. Three hundred yards above our camp of this evening is the mouth of the Salmon Trout river, which flows into the Big Blackfoot from the north, and passes between rocky bluffs just above its mouth. These bluffs furnish very good building material, and thus will be useful to a wagon road or railroad construction.

Saturday, July 21.—Commencing our journey at a little after 7 o'clock in the morning, we crossed in $2\frac{1}{4}$ miles the Salmon Trout creek. The valley of the Blackfoot is now some seventeen miles wide, well watered and well grassed throughout. The larger streams, however, come in

from the north. After making nine miles from our morning's camp, we reached my camp of September 25 and 26, 1853, and Lieutenant Donelson's camp of September 24 to 26, 1853, on the main Big Blackfoot, south of which point the valley makes a large re-entering to the south, with banks above the water level some sixty feet, although at Lieutenant Donelson's camp the width of the banks above the water is but twenty feet; at this point the Blackfoot flows nearly southward some five or six miles, at which point it receives a tributary running nearly from the east. Here there is a very extensive prairie valley bordered by a rolling prairie country. Although we did not have a good view of the upper portions of this tributary, yet, from information collected from our guides, we learned that there were considerable prairies and good land nearly all the distance up to the divide of the Rocky mountains, from whence it has its source, and that, also, in this direction is a trail leading to the waters of the Missouri. Starting, however, from our camp of 1853, and keeping on the north bank of the Blackfoot, passing over a low bluff coming well down to the banks of the river, we, in a quarter of a mile, came to the entrance of the *cañon*, so called, not because its sides are perpendicular bluffs, but because the wide and open valley through which we pass now narrows somewhat, being at times only about one-quarter to one-third of a mile wide. As we entered this *cañon* we found the Blackfoot to flow sluggishly through it, with low banks five feet above the water level. The river is somewhat winding, yet requiring the trail to pass over only very low spurs. This *cañon* is generally wooded, and there is some fallen timber on the trail, but nothing in the way of serious obstruction to animals, and plats of grass were found from point to point sufficient for very good camping grounds. As we entered the *cañon*, it may be remarked, we passed over the bluff already referred to, making at one point a height of 120 feet above the river, which gave us a very excellent view of the country to the south, and the southeastern tributary already referred to. The width of the open valley here is some fifteen miles. The divide separating these two branches of the Blackfoot, both having their sources in the Rocky mountains, was wooded, and some 400 to 500 feet high. To the north, a hill immediately overlooking the *cañon* was about the same height. I will observe that the prairie valley of the Blackfoot, for the last 22 miles before entering the *cañon*, has an average width of ten miles, with three large creeks coming from the north and one from the south. This does not include the prairie spurs and divide between the Blackfoot valley and the Hell-Gate, nor does it include the prairies to be found on these various tributaries, some of them very extensive.

But to continue on in the *cañon*. The first eight miles has been sufficiently described. Barometrical observations were taken at necessary points, and the streams were found to be sluggish all the way. Three and a half miles further brought us out of the *cañon* into a fine opening of the prairie known as the Belly. The general width of the *cañon* was two-thirds of a mile. Towards its upper portion, that is, for the last $3\frac{1}{2}$ miles, there were no falls in the river, but the current was rapid. Some crossings of the stream will be required either in the construction of a railroad or a wagon road. The timber growth on the side hills is getting to be smaller. The next $7\frac{1}{2}$ miles takes us through the beautiful Belly prairie of the upper Blackfoot, beautifully wooded on the adjacent spurs, and with cotton-wood in the immediate valley of the stream; well watered, and grass luxuriant. In the first mile and a half of this distance we cross two streams coming in from the left. After crossing the second of these streams we continue along its banks for some three miles. This portion of the valley averages some four

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miles wide, and near the middle portion of it is about six miles wide. Here, again, the Blackfoot flows with a rapid current, but few falls. The banks are low. The greater portion of the Belly prairie is inter-vale land. We then, after travelling half a mile further, left our trail and went south to the Blackfoot, a distance of three-quarters of a mile, where we encamped. I have thus been particular in describing the Belly prairie of the Blackfoot river, because, being so near the divide of the Rocky mountains, as will appear by the account of to-morrow's journey, I desired to present the character of this country as shown in one of its mountain valleys.

Sunday, July 22.—Leaving camp early this morning, and starting from the point where we left the trail yesterday to camp on the Blackfoot, in $2\frac{1}{2}$ miles we reached a large tributary coming from the north, which was named by Mr. Doty, in his trip in 1854, as Lander's Fork. This name I have thought it best to retain. At this point I despatched a train, in charge of Mr. Higgins, up Lander's Fork, along the usual travelled trail, to Lewis and Clark's Pass, and continued up the Big Blackfoot myself, with my secretary and interpreter, Doty and Sohon, in order to make the connexion of the railroad line from Lewis and Clark's Pass to the Blackfoot, which had not been established by Mr. Lander in 1853. I proposed to go up the stream flowing from Lewis and Clark's Pass to the point where this examination was abandoned, as stated in the report of Mr. Lander. So continuing up the Blackfoot valley for $4\frac{1}{2}$ miles, I came to the creek which I supposed to be the creek flowing from Lewis and Clark's Pass. I found that up this portion of the valley there would be no difficulty in arranging grades to the ground without heavy excavation and embankment; and entering a low (comparatively speaking) cañon, from which the stream flowed into the Blackfoot valley, I found there would be no difficulty in keeping on side hills, making some sharp curvatures, and entering the valley at a sufficient height to obviate all difficulties ahead. We went up the stream and soon came into a large very gently rolling prairie of several thousand acres in extent, beautifully grassed, cotton-wood on the streams, pine on the upper portion of the streams, and the country generally arable. As we passed up this prairie, looking eastward we saw the divide of the Rocky mountains, and we could perceive no special traces of the tributary between us and the divide. But the stream gradually gave out; and continuing almost northward, we fell into the trail passing from Lander's Fork to the stream flowing from Lewis and Clark's Pass, for which we had been searching, and over which trail the hoofs of our animals had passed that morning. Continuing on the trail, we reached the stream with the satisfaction of knowing that, though we had learned some features of the country, we had yet pretty much all our work to do over again. After taking the necessary barometrical observations, I went down the stream for some two miles, one mile and a half of this distance lying over a remarkably uniformly descending river bottom. Then the stream turned immediately to the south and passed through an impracticable cañon. In order to get a view of the country we immediately ascended some very steep bluffs to the eastward, towards the divide of the mountains, and finally reached a point where the whole country lay before us. Here we saw the rolling prairie over which we had passed this morning, the stream from Lewis and Clark's Pass winding on its left through the rocky cañon, and at our feet a very low divide, which made it almost a matter of demonstration to us that we could pass from the valley stream by a low cut to the open prairie, and gain the Big Blackfoot by the stream up which we had come. Immediately pushing down to the low divide

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BIG BLACKFOOT VALLEY.

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referred to, I caused a sketch of the country to be made, had the necessary barometrical observations taken, and found not the slightest difficulty, by a cut of a few hundred feet, in carrying a railroad line down on grades not exceeding from sixty to sixty-five feet to its connexion with the Big Blackfoot; and thus, partly by accident and partly by indefatigable exertions and good judgment, we were able to accomplish the connexion of the line of the Big Blackfoot with the line from Lewis and Clark's Pass.

Starting now from the point where the trail from Lander's Fork strikes the stream flowing from Lewis and Clark's Pass, we continued up the latter stream for five miles, passing over the most remarkable valley that I have ever seen in the immediate region of a mountain divide. Its width and the declivities of the ground were remarkably uniform; the valley not less than half a mile wide; the bottom—excepting a small portion of the lower part, where were beaver dams—always above the freshets, until we came to a point where I halted for a few moments in order to observe with the barometer. Here there was a fork in the stream, the left hand branch coming immediately from Lewis and Clark's Pass, and the larger and right hand fork coming from the north some little distance, judging from the quantity of water in the stream. We now kept up the left hand fork and passed over Lewis and Clark's Pass, where many observations were taken, both of the immediate bases of the divide on either slope and at the summit. This divide can be arranged for wagon roads with gentle declivities on either side. Little or no timber would have to be cut away. We found grass on both sides of the mountain, as well as near its summit. Going down the eastern base on our right, and some little distance below the trail, was a fine stream of water, a tributary of the Dearborn, and about a mile and a quarter from the summit we came to another tributary connecting with this coming from the north. It is on this tributary that a railroad line must be laid in order to tunnel the mountain in the shortest and most practicable line. From the top of the mountain, it may be remarked, we had a delightful view of the country before us about an hour before sundown. The air was perfectly transparent, and we could see, running nearly to the north, the mountain spurs of the main chain of the Rocky mountains, with many tributary valleys and streams connecting with the Beaver creek and Dearborn, whilst the country between us and the Dearborn, and beyond it as far as the eye could reach, was somewhat broken, yet it was uniformly well grassed; and, as we travelled over the route to the night's camp, we found large portions of the country arable, although it would be impossible to predict to what extent farming would be restricted by the early and late frosts. I found that to lay a railroad line along the spurs of the approach to Lewis and Clark's Pass it would be necessary to curve in and out, in order to cross the various mountain valleys with embankments not excessive, and that even then it would be essential to deal boldly with the projecting spurs; but the most serious difficulties in this way would occur the first two miles from the entrance of the tunnel, and all the embankment involved in establishing the road would be furnished from the excavation of the tunnel, and therefore cease to be an item of expense or even of difficulty. After crossing several low divides and intermediate streams and valleys, I reached camp, greatly exhausted by the night's work, an hour and a half after sundown, where I had been preceded by my train some four hours, and where everything abounded that was required to furnish the conditions of a good camp.

Monday, July 23.—Leaving our morning's camp, in three-quarters of a mile we ascended the

valley to a ridge some seventy feet above it, and in three-quarters of a mile more came to a ravine ninety feet below the route on either side. Here there is no difficulty in laying either a wagon road or a railroad so as to essentially avoid this ravine. In one mile and a quarter we came to a ridge whence the ground descends to Dearborn river. Thus far on our morning's journey the ground has gently undulated. The second ridge referred to is slightly higher than the first; and two successive ridges occur, rising perhaps twice as much as these particularly described. To the left of us the ground in about six hundred feet rises about one hundred feet—that is, on a grade of one to six; and on the right it falls about the same distance in some eight hundred feet. These particularities of the ground are given to show the little difficulty there will be in laying the grade along this portion of the route without very heavy excavations and embankments, but in the railroad report the matter will be gone into in great detail. The next one and seven-eighths mile the ground is also gently undulating; there are no special features that require mention except that at the end of a mile and a half there was a ravine some forty feet deep, which in three-eighths of a mile gave out and was replaced by a low ridge. On the left the ground still gently undulated; and to avoid the little peculiarities of the ground, and the ravines and ridges which have been mentioned, the road will be laid about one-third of a mile to our left. In half a mile further the trail passes down a ravine and up a rise, when we have a view of the valley of the Dearborn river, and in a quarter of a mile it descends into the valley of the Dearborn, which, although somewhat narrow, has fine grass and excellent soil. Here the valley of the Dearborn opens into a beautiful *ronde*, affording a most delightful spot for a camp. This is an old Indian camping ground. The *ronde* extends about three miles along the river, and it is about one-third of a mile across. One mile up the valley of the Dearborn its banks come together, affording all the facilities for bridging. The valley itself is some three to six feet above the water level, and is never overflowed. The trail crosses the *ronde* diagonally for about half a mile, and in one-eighth of a mile we reach the immediate crown of the height bordering the valley, and in five-eighths of a mile further reach a divide, presenting to our view a generally level but somewhat undulating country. Here we have a view of the Heart mountain, of the *debouche* of the Dearborn river from the mountains, and of the general character of the country. Going northward half a mile to a point giving a very good view, I could see how, by leaving our trail some miles on the other side of the Dearborn and keeping well along the side hills, I could cross the Dearborn one and a half to two miles above where it was crossed by the trail, and lay the line along its valley somewhat, and on an extension about midway between our trail and the Heart mountain, so as to give good grades without heavy excavation or embankment, but with some rock cutting. It may not be necessary to give the minute details of the remainder of our day's journey, except to say that the country consists of a series of low divides and intermediate depressions until we come within some eight miles of the forks of Sun river. We took a considerable number of observations, in order to have all the means of making the profile. We had a clear and distinct view of the Elk or southern fork of the Sun river, which furnishes a most excellent railroad line; and crossing to it from the line already referred to as the proper line of direction in the vicinity of the Dearborn, will enable the road to descend into the valley of the Sun river with very light excavation and embankment, and with no difficulty of a serious character at all, save from a point some six miles above the forks. The plateau or prairie country immediately bordering Sun river was

replaced, at one and a quarter mile from the forks, by a low slope connecting this plateau with the immediate valley of the stream. The distance travelled to-day was 22 $\frac{7}{8}$ miles. On our route, at a point designated on the map, a view was taken of the Heart mountain, of the gate of Sun river, and of the *debouche* of Dearborn river, and I will respectfully refer you to this view as giving, in connexion with the map, the best idea of our route and of the mountain spurs bordering it. I will observe, speaking of the Dearborn river, that about a mile and a half above our crossing it has a direction nearly parallel with its course below the crossing; that then it turns for three miles well to the north and east, and with another turn more to the west is seen to issue from the mountains two miles and a half beyond.

A very good description of Sun river will be found in a previous portion of the volume. I found Mr. Doty's description to be very correct. I am satisfied, from the appearance of the forks and the adjacent country, from a large depression south of our trail, which I took to be Grizzly Bear lake, that Mr. Doty is correct in his judgment that Mr. Lander, in 1853, crossed Sun river, not at the forks, but at the island some six miles below. Looking back to the previous route in 1853, I found the country within six miles of the forks to present more difficulties in the way of a railroad than I had expected; and it would not be practicable to adopt grades to the ground of less than sixty feet, without exceedingly heavy excavations and embankments, and very sharp curvatures. On the line laid down by Mr. Lander, the excavations and embankments as far as Sun river would be very excessive; southward to Cadotte's Pass, it would be a difficult matter to adjust a railroad line from the forks of Sun river without, also, heavy embankments. It is indispensable for either pass, if the forks of Sun river are made, to keep up the south fork somewhere about ten miles, and to pass somewhat nearer to the Heart mountain than on the line reported by Mr. Lander. Sun river, from the generally wide, open, and direct character of its valley and the facility with which its lower portion may be turned to approach Fort Benton, on the general line of the Missouri from Sun river to Fort Benton, is a feature in the railroad practicability of this portion of the country. I would not, therefore, think it expedient, Sun river being once made, to continue over the upper portion of the plateau from the Sun to the Teton, thence to the Marias, and thence to the Milk river, but to take a line which will bring us to the waters of the Missouri at Fort Benton, and thence to Milk river. But to resume our narrative:

Tuesday, July 24.—The width of the river at our morning's camp is some sixty yards; the highest water above the present water level, sixty feet; the length of bridge required to cross, 200 feet; its height above the water level, ten feet. The banks consist of sandstone, clay, and gravel. At this point the forks of the river have a very gradual ascent and descent, presenting no difficulty in the way of construction. The general character of the country on to-day's journey is very much as on the route of yesterday, from the Dearborn to the Sun river. The country is rolling and undulating, and by reference to the profile the best idea will be obtained of the relation of the several divides, of the rolling prairie, and the corresponding valley depressions. The first 2 $\frac{3}{8}$ miles from the river brings us to the top of the first plateau, and 2 $\frac{5}{8}$ miles further we reach the crest of the second divide. In 3 $\frac{1}{4}$ miles we reach a third divide, and in 1 $\frac{5}{8}$ mile a fourth. These ridges run nearly east and west, and have to be crossed almost directly in laying a railroad line over this upper plateau. The fifth divide, three miles further on, which is lower than the previous ones, brings us in view of the valley of the Teton. In two

miles further on, and about a mile and a half to the right of our trail, we observed a small lake, having little or no water in it at the present time, but evidently, from the appearance of the green rushes, a considerable lake in the spring, and probably the early summer. This we took to be Mr. Lander's Grizzly Bear lake. Going on three-eighths of a mile further, there was a small formation of *mauvaises terres*, at the end of which was a small descent of the country, where immediately on the left of the trail we observed three beautiful springs of cold water, discharging about a gallon and a half per minute. This water wells out of the clefts of the rock, is very pure and cold, and feeds a stream which flows about one hundred feet before the water is absorbed into the ground. Our distance now for five miles, to the edge of the plateau bordering on the Teton, is a level prairie, similar to the country about the forks of Sun river; when, moving down the river a quarter of a mile, we camped on its banks in a beautiful piece of intervalle, some four feet above the water level, where the river branches out somewhat into sloughs, which are obstructed by beaver dams. The Teton valley has been described previously, and therefore it will be sufficient for me to say that we continued down the Teton, having, on July 25, a good view of the Woman's Breast, (whence the Teton derives its name,) of its upper tributaries, of its bottom and miry creeks. Making 26 miles this day, and on Thursday I pushed on to Fort Benton, my train coming in the next day. Here I was much pleased to meet my old acquaintances, but learned nothing of the whereabouts of Colonel Cumming, my associate commissioner. This, I expected, would give me some time to make some other examinations of the country. I very much regretted to find that the arrangements made by Mr. Doty for barometrical observations, during the past winter and the present year, had been ineffectual, in consequence of Mr. Tevis, the gentleman who undertook to take them, having returned to St. Louis early in the winter. My party were camped on the Teton, where Mr. Sohon was busily occupied in working at the sketches of the route, and where he took regular barometrical observations through the day; and on the 11th of August, having received three days previously a letter from Colonel Cumming, who was at the Porcupine river, informing me that he should move along as rapidly as possible, I concluded to go on to Milk river to meet him, more especially as I was anxious to avail myself of the opportunity of reviewing this portion of my route again. So, accompanied by Mr. Doty, Mr. Sohon and a small party, we reached Milk river on the 13th of August, camped the first night at the springs, and the second night at the Box Elder creek, eighteen miles from Hammell's houses on Milk river. It is probable that this portion of the country has been sufficiently described, and the results of this little trip will appear simply in the details which I shall furnish of the railroad line along this portion of the route. It would encumber this narrative to go outside of the subject which I propose to present, but I will observe that the use of our numerous expresses, indispensable to keeping in hand and bringing together the Indians, enabled me considerably to extend our knowledge of the country. Without referring particularly to dates, we got valuable information from Mr. Doty, from Sub-Agent Tappan, Special Agent Adams, Mr. Burr, and especially Dr. R. H. Lansdale, Indian agent, as well as from A. H. Roby, who had charge of our hunting parties, making at one time a trip to the Judith for buffalo meat, at another time nearly to the Three Buttes, and making several trips down the Missouri either to the boats to get provisions at the mouth of the Muscle Shell, or to the Citadel rock to kill bighorn. A most remarkable incident at Fort Benton, which I will give, because it illustrates somewhat how voyaging may be done in this country. In the

arrangements which I made in the Bitter Root valley with the Indians to attend the contemplated council on the Missouri, I was met by the objection that there being no escort to protect them, their old enemies, the Blackfeet, would steal all their horses. I reminded them of the message which I had brought them from the Blackfeet in 1853, and assured them of my belief that they would be received in good faith, and treated with kindness and hospitality by the Blackfeet, using this expression, "I will guarantee that when you pull in your lariat in the morning you will find a horse at the end of it." On the 29th of August, about sundown, four Pend d'Oreille boys came to my camp, which a few days before had been removed from the Teton to the Missouri, a quarter of a mile above Fort Benton, with a message from their chief, Alexander. Very much against their own judgment they placed their horses, by my direction, with those of my own band; but before midnight two Blackfeet boys, of the northern tribe, picked them out from a hundred horses and ran off with them, we could not discover where; for although I put the Little Dog to search for their trail, thirty hours' work and a hundred and odd miles hard riding did not enable him to find a single foot mark of the missing animals. To get these animals back, therefore, was necessary to inspire our western Indians with confidence, and was, indeed, indispensable to making the treaty. Accordingly, without waiting the return of the Little Dog, we sent Mr. Doty, with a single white man, north to the camp of the Blackfeet on the Saskatchewan, to recover these animals. We thought the Blackfeet would expect us to search for them among their bands down and south of the Missouri, and that they felt perfectly secure from being followed up so far north. Mr. Doty continued on the trail, making fifty miles a day, sleeping several times on the prairie, until he struck the Bow tributary of the Saskatchewan, two hundred and thirty odd miles from Fort Benton, entering the large Blackfeet camp two hours only after the four stolen horses. He immediately called the chiefs, demanded the horses, received three of them, and placed them in the hands of the Little Dog, who, after returning from his fruitless search for the trail, had started off, without resting, to join his old friend Doty. One of the scamps, however, got off with the fourth horse, and Mr. Doty started off immediately in pursuit, moved seventy miles and over in a day, to the Elk tributary of the Saskatchewan, and there received from the chiefs the fourth horse; and on the sixteenth day after these horses were stolen from my camp they were returned to the four Pend d'Oreille boys at Fort Benton. This was the last, as it was the first, stealing of horses by the Indians. A full account of this trip of Mr. Doty is given in the proceedings of the Blackfoot council, of which the following summary is given:

Starting from Fort Benton on the evening of August 30, he crossed the Marias river on September 1, about thirty miles from its mouth. The river was seventy yards wide, and two and a half feet deep at the ford, with a three mile current. The valley was from one-half a mile to two miles wide, well timbered with cotton-wood, and having a soil of reddish or ash colored loam, which in many places appeared well adapted for agricultural purposes.

He then crossed the plain northwestward to the base of the most westerly of the Three Buttes, where there was a fine grove and several springs of excellent water. Thence, continuing northward, he reached a coulée tributary to Milk River valley, which had perpendicular walls of red sandstone a hundred and fifty feet high, wooded along the stream with the narrow leaved cotton-wood, a tree common from the eastern base of the mountains to the Pacific coast.

Crossing Milk river, he passed to a high, level plain, of different character from that on the

south side. The soil is a sandy loam; the grass, though short, forms a heavy turf, and the prickly pear had disappeared. Twenty miles due north he reached Lake Pah-ka-kee, or Unlucky Water, which has a strong odor of sulphureted hydrogen, perceptible at a distance of a mile. The Indians and horses drank of it without any bad effects, although it had been supposed to be the cause of death to a number of horses lost here by the Indians some years before. The report of its being *salt*, before generally credited, was thus disproved. Its shores are gravelly, and its water clear. It lies at some distance north of latitude 49° . Forty-seven miles further north he struck the Mo-ko-un, or Belly river, fifteen miles above its junction with Bow river. The stream is here 150 yards wide, and is deep, with a current of four miles per hour; the water clear and cold, the shores gravelly and sloping. It is subject to a freshet of forty feet, as shown by the pine driftwood scattered in its valley. No timber grows on its banks near the point then reached. Going up this river about twenty miles, he left it and followed a branch destitute of wood towards the northwest, and across the plain beyond for thirty miles, to a marshy lake, and twenty miles further reached Bow river. Then followed this up for thirty miles, and crossed it at a ford 300 yards wide and so deep as to run over his saddle. This being the last encampment of the Indians who hunt and trade on American soil, he started on his return September 8. There was a heavy storm of rain and hail that night and the next two days. He arrived at Fort Benton on the 15th, having travelled 583 miles, and connected the reconnaissance of Mr. Stanley and Mr. Tinkham with his own exploration along the eastern base of the mountains, and examined the country far northward of the boundary line.

Both wood and water became more scarce northward, for although the rivers are large and deep they have fewer and more distant branches, and are usually destitute of timber.

Mr. Adams and Mr. Tappan remained with the Indians nearly all the time until the council was assembled in October, the former with the Flatheads, and the latter with the Nez Percés, in the country between the Missouri and the Yellowstone. Following down the Judith river to its mouth, following out a considerable portion of the Muscle Shell, and over a hundred miles of the Yellowstone, Mr. Tappan went south of the Yellowstone, some distance up the upper tributaries. The country south and east of the Judith, in the direction of the Yellowstone, they found somewhat deficient in grass and water. In September Dr. Lansdale, the Indian agent, made a careful examination of the Bitter Root valley and of the country on the Flat-head river, from the Cerican defile northward and eastward, through a country watered by the Jocko and Prune creek, and other streams; and he describes that whole country of which you have a view, passing from the valley of the Hell-Gate to that of the Jocko river, as one of the most rich and inviting countries he ever saw; the view most extensive, the country, arable, the streams well timbered, and good facilities for establishing mills and supplying them with timber.

The council was not, however, held at Fort Benton, but at the mouth of the Judith, which enabled us to extend our barometrical observations down the river and to examine something of the adjacent country. The country in the neighborhood of the mouth of the Judith, and the greater portion of it between that point and Fort Benton, presents good inducements to the settler. Formations, however, of the *mauvaises terres* occur at some points, and twenty miles below Fort Benton is the famed Citadel rock, an extraordinary resort for bighorn and smaller game. I will here remark that we had in our employ an Indian hunter, Metsik, who never

failed, starting out early in the morning, to get back by night, always heavily laden with the meat of the antelope and the deer. As we had very little bread, sugar, and coffee, for a change of fare the bighorn of Citadel rock was exceedingly delightful as an article of food, and is preferred generally by the mountain men to any other game of the country, except buffalo; so between buffalo, bighorn, and the smaller game we fared very well. The parties who extended our information of the country in conveying messages to the Indians, &c., invariably lived either on the dried meat which they took with them or on the game which they killed from day to day; they had no flour, no sugar, no coffee, and yet there was not a word of complaint from one of them; but we made it the subject of a good deal of merriment when we were able to reach the boats and have a sufficiency of those articles which in civilized life are deemed indispensable to comfort. As the moving of expressmen, also, will give some idea of the practicability of a country, I will remark that on the 27th of August, my expressman, Pearson, reached camp from Olympia, having made the distance from the Bitter Root valley to Olympia and back to Fort Benton, some 1,750 miles by the road he travelled, in twenty-eight days, on some of which he did not travel. He was less than three days going from Fort Owen to Fort Benton, a distance by the route he pursued of some 260 miles, which he travelled without a change of animals, having no food but the berries of the country, except a little fish which he killed on Travellers' Rest creek of Lewis and Clark, on the morning of starting from Fort Owen, which served him for a single meal. I might refer to other incidents which occurred at this council, showing how easy it is to travel in this country, but one more will probably suffice. My son, Hazard, thirteen years of age, had accompanied me from Olympia to the waters of the Missouri. Like all youths of that age, he was always ready for the saddle and delighted in the hunt, and had spent some days with one of my hunting parties on the Judith, where he had become well acquainted with the Gros Ventres. When we determined to change the council from Fort Benton to the mouth of the Judith, I undertook, in the name of the commission, the duty of seeing the necessary messages sent to the various bands and tribes, and to bring them all to the mouth of the Judith at the proper moment. These Indians were scattered from Milk river, near Hammell's creeks, along the Marias, along the Teton, to a considerable distance south of the Missouri, the Flatheads being on the Judith, and the Upper Pend d'Oreilles on Smith's Fork of the Missouri, with two bands of the Blackfeet lying somewhat intermediate, but in the vicinity of the Girdle mountains. I succeeded in securing the services of a fit and reliable man for each one of these bands and tribes, except the Gros Ventres, camped on Milk river. There were several men who had considerable experience among Indians and in voyaging who desired to go, but I had not confidence in them, and accordingly, at 10 o'clock on Sunday morning, I started my little son as a messenger to the Gros Ventres. Accompanied by the interpreter, Legare, he made that Gros Ventres camp before dark, a distance of 75 miles, and gave his message the same evening to the chiefs, and without changing horses they were in the saddle early in the morning and reached my camp at half-past three o'clock.

Thus a youth of thirteen travelled 150 measured miles from ten o'clock of one day to half-past three o'clock in the afternoon of the next; and he came in so fresh that he could have travelled without fatigue at least thirty miles further that evening. The Gros Ventres made their marches exactly as I had desired, and reached the new council ground at the mouth of the Judith the

very morning which had been appointed, being the first of all the bands and tribes. Our examination of the Yellowstone tended to verify the accuracy of Lewis and Clark's survey of it, and showed that in our previous maps we had got the course of the stream too far to the south. I will refer in this connexion to three of the remarkable mountain men of that country, who were with me through this season's trip, and who had hunted and trapped on the forks of the Missouri and on the waters of the Yellowstone and its tributaries—the interpreter, William Craig, a Delaware Indian, also one of the Nez Percés interpreters, by the name of Jim, and a half-breed Shawnee, known as Ben Riser, one of our Flathead interpreters. Ben Riser and Delaware Jim both speak English, the first quite well; and they were exceedingly reliable men as interpreters, and remarkable as hunters and as guides. To show how Delaware Jim could lead a party, towards the close of our stay at Fort Benton, and before we moved to the Judith, I despatched our packmaster, Higgins, with the guide Legare, to some bands of the Nez Percés on the Yellowstone, who I was fearful might be compelled to go very far, perhaps even to the forks of the Missouri, in order to get meat. They had already suffered much from the want of food; we knew their general line of movement, and time was very essential to be saved in reaching their camp. Although the Delaware had not passed over this portion of country before—that is the country from the Missouri to near the Yellowstone—yet so thoroughly was he possessed of the general knowledge of the Yellowstone country, and of the extreme upper portions of the Missouri and certain general ridges and mountain heights which would flank the route, that he undertook and actually did take the party on an air line to Clark's tributary of the Yellowstone, and, as I was informed by the whole party, struck their camps, hardly making a detour of a mile on the road. They also moved very rapidly, some fifty miles a day. I will here remark, that I doubt whether such an express service as we were obliged to employ at Fort Benton to keep the Indians in hand was ever employed in this country with the same means. Many of our animals, which had done service all the way from the Dalles, travelled at express rates more than a thousand miles before we started on our return from Fort Benton. Many of our mules travelled from seven to eight hundred miles with packs, in going to the boats for provisions and to the hunting grounds for meat; and yet, after our treaty was concluded and we were ready to move home, we were able to make very good rates with these same animals, although the season was so late as November.

I had forgotten to mention in the proper place that, whilst at Fort Benton, I examined the Missouri towards the mouth of the Marias, and especially a very narrow place, called the Craconder Nez separating the Teton from the Missouri. This place is only about one hundred yards wide, and will require simply that length of cutting to bring a railroad line from one river to the other. The Teton valley was only about forty feet higher than the corresponding valley of the Missouri, and there will be no difficulty in adjusting an easy grade.

We got through with the Blackfoot treaty, everything having succeeded to our entire satisfaction, and, indeed, beyond our most sanguine expectations. The greatest delight and good will seemed to pervade the minds of all the Indians, and we left them at the mouth of the Judith on our way to Fort Benton, and thence to the waters of the Pacific, rejoiced that our labors had had such a consummation. I do not propose to give a detailed narrative of my return trip, but simply to refer to such points as may be necessary in my purpose of presenting the character of the country. I had intended making many observations and examinations on

my way back, in the way of detail, with a view of perfecting the information already gained, but the second day of my march from the Teton my expressman, Pearson, reached my camp with information of the Indian war which had broken out in Washington and Oregon, and of the defeat of Major Haller. He brought me letters from official sources, stating that my only chance of safety was to go down the Missouri and return to the western coast by the way of New York. I remained in camp the following day, October 30, to make my arrangements to meet this unexpected condition of things; for my determination was fixed and unalterable that an attempt should be made to reach the settlements by the direct route, and that all dangers on the road should be sternly confronted. I sent back Mr. Doty to Fort Benton to get a large quantity of powder and ball, additional arms, and additional animals; put my force into camp awaiting his return, and at noon the next day, October 31, with Roby and Delaware Jim, we started to ride express to the Bitter Root valley. That night we camped on Sun river, having made a distance of some twenty-nine miles from about noon to sundown.

On the 1st of November we were in saddle at early dawn, pushed towards Cadotte's Pass, between the Crown Butte and Rattlers, passed by the Bird Trail rock, crossed the Dearborn, and went into camp four miles before reaching the divide, at a point which was the camp of Lieut. Grover and Mr. Roby in their winter's trip of 1854. This evening a snow came on about an hour before sundown, or we should have crossed the divide that night. The weather in the morning was clear and beautiful, but as we had no tent, we got breakfast before leaving camp, and built up a large fire in order to dry ourselves; and at half past eight o'clock we were on the road. There were some six or seven inches of snow on the ground, but the weather was extremely mild, and the snow was rapidly passing away. I went up the divide on the ravine north of the usual trail, and was able to find a very good route for our animals. There was little or no snow on the western slope of the divide; continuing down the Blackfoot valley $5\frac{1}{2}$ miles, the snow was only an inch or two deep, and entirely passed away before we reached Lander's Fork. I will here observe, that Mr. Doty with the train crossed the divide some six days after us, and found not a particle of snow on the trail. We halted at Lander's Fork for a few minutes to rest our animals; then moving very rapidly through the Belly prairie and cañon, we came out on the large prairie of the Blackfoot at a little after dark, camping where I had camped with Lieutenant Donelson in 1853. The next day we were in the saddle early, and, moving over this prairie at a very rapid rate, ate breakfast at a point some eighteen miles from our morning's camp, and made our evening's camp within about ten miles of the Hell-Gate crossing to Fort Owen. The next day we reached Fort Owen, meeting at the Hell-Gate crossing some Indians, by whom I was able to communicate with Dr. Landsdale, who had preceded me to the Bitter Root valley, under instructions to confer with the Indians, to the end that if they desired to make a treaty at this time, I would meet them for that purpose. This rapid trip from the Teton to Fort Owen in the month of November shows the practicable character of the country; and I have referred to it rather in illustration of the fact that I had the opportunity of making a comparison of the approaches of Cadotte's Pass with those of Lewis and Clark; having observed and seen both carefully, the former twice. On our way to Fort Owen we had met a Nez Percés delegation on their way home, and had made arrangements to meet them at the crossing of Hell-Gate, in order to confer about difficulties ahead. After waiting a day at Fort Owen, I moved down to and established my camp at Hell-Gate, to await the arrival of Mr. Doty. I was here able to gain *no* additional information of the condition of the Indian tribes

between the Cascade mountains and the Bitter Root, but the reports were that all were in arms except the Nez Percés, a great part of whom were said to be disaffected, and some of them even hostile. I now purchased every good mule and horse that I could get in this valley; for it was my determination to endeavor to have my whole command in a position so that they could move rapidly and act promptly. The question was, what should be our route home. It was important, it seemed to me, to our success that we should be able to cross the mountains and throw ourselves into the nearest tribes, without their having the slightest notice of our coming. I felt a strong assurance that if I could bring this about, I could handle enough tribes and conciliate the friendship of enough Indians to be strong enough to defy the rest. There would certainly be no difficulty from the snow down Clark's Fork; but it was known that the upper and lower Pend d'Oreille Indians were along the road, and no party could travel over it without its approach being communicated to the Indians; whereas Indian report had it that the Cœur d'Aléne pass was blocked up with snow at this season of the year, and I felt satisfied that they would not expect us on this route, and therefore I determined to move over it. It was the shorter route of the two; it was a route where I desired to make additional examinations; it was a route which enabled me to creep up, as it were, to the first Indian tribe, and then, moving rapidly, to jump upon them without their having time for preparation. I knew that Kamiakin and Pu-pu-mux-mux had sent a body of warriors to cut off my party; and that we had to guard against falling into an ambush, but an Indian has not patience to wait many days for such a purpose, and I thought, looking to all these things, that the line of safety was to move over the Cœur d'Aléne. Mr. Doty arrived at Hell-Gate on the 11th day of November, and after waiting until the fifteenth day of November to make the necessary arrangements with Dr. Lansdale, whom I left in charge of the Flathead Indians, with my friend, John Owen, and the Jesuit missionaries, I pushed down the Bitter Root valley. I need not go into the details of this trip, except to say that my party, almost without a single exception, apparently looked upon the undertaking as a very desperate one, but still they were cheerful, obeyed every order with great alacrity, and enjoyed themselves very much in the evening's camp. We crossed the Bitter Root mountain on the twentieth day of November, the snow being three feet deep, and reached the creek at its western base a little before dark—too late to go to the good grass known to be some six miles beyond. This was the only night that we were without grass. The next morning I directed Mr. Doty very carefully to examine the upper waters of this Cœur d'Aléne creek, while I with the party moved on to grass and waited for him another day. In two hours we were in good grass, with fine water—a fine range for animals. They were now a good deal exhausted, for we had moved rapidly with the train from the Teton, and I determined to wait there another day to recruit. From the appearances of all that surrounded us, I was satisfied that there were no Indian runners on the lookout for us. On the twenty-third day of November we raised camp, made a good day's journey, and camped near our old camp in June. We were now about twenty-five miles from the Cœur d'Aléne Mission. It was impracticable for me to take the whole train in one day without breaking down our animals; so, with Pearson and Craig, and four Nez Percés, I started at daylight, determining to reach that tribe that day, and leaving directions for the train to come in the following day. So we pushed on very gently and quietly at first, and when we came within sight of the Mission and the Indian village we moved rapidly, throwing ourselves into the midst of the Indians, and with our rifles in one hand, and our outstretched arms the other side, we tendered

to them both the sword and the olive branch. They met us all very cordially; every Indian left his lodge and gathered around us. I had told the four Nez Percés, "when you reach the Cœur d'Alénes, talk to them Blackfoot; tell them about our great council and treaty at Fort Benton; tell them that they can hunt buffalo without being disturbed by their hereditary enemies, the Blackfeet; tell them that the lion and the lamb have laid down together; get their minds off their troubles here, and turn them to other subjects in which they take an interest." It is enough for me to say that we established the most cordial relations with the Cœur d'Alénes. We found that the emissaries of the Yakimas had only left that point some four or five days, having despaired of our crossing the mountains. The train came in the next day, and I now determined to push on to the Spokane, having first despatched from the Cœur d'Aléne mission Craig and a part of the Nez Percés home to that country to bring them into council and to make arrangements for moving below to the Dalles. Moving from the Cœur d'Aléne mission on the twenty-seventh day of November, I made our first camp at the Wolf's lodge, some nineteen miles from it, and the next day made a forced march, moving forty miles to the Spokane country. We met Polakin, one of the principal chiefs of the Spokanes, on our way, and were at Antoine Plant's before dark. Here I found some of the miners from Colville. Before midnight Indian expresses were on the road to the lower Spokanes, to the Colville Indians, and thence to the Okinakane and to the lower Pend d'Oreilles, asking them to come and meet me in council at that point. I also requested Mr. Angus McDonald and the Jesuit fathers at Colville to visit my camp. We remained on the Spokane nine days, and I had there one of the most stormy councils for three days that ever occurred in my whole Indian experience; yet, having gone there with the most anxious desire to prevent their entering into the war, but with a firm determination to tell them plainly and candidly the truth, I succeeded both in convincing them of the facts and gaining their entire confidence. At this council were all the chiefs and people of the Cœur d'Alénes and of the Spokanes—the very tribes who defeated Steptoe the past season, the very tribes who have met our troops since in two pitched battles; and I feel that I can without impropriety refer to the success of my labors among these Indians, backed up simply with a little party of 24 men. When our council was adjourned, the Indians gave the best test of their friendship and affection, by each one coming to lay before me his little wrongs and ask redress. They came in a body and offered me a force to help me through the hostiles of Walla-Walla valley and on the banks of the Columbia, which I declined, saying that I came not among the Spokanes for their aid, but to protect them as their father.

I now determined to move to the Nez Percés country, although on the Spokane the uniform feeling of the Indians was, that they were hostile and would try to get us into difficulty—a conclusion which seemed to be much supported by the fact that the Nez Percés chief, the Looking Glass, who had accompanied me to the Spokane, endeavored to betray me there. This little incident will serve to explain to what expedients one has to resort in these cases of difficulty. I had made a forced march to the Spokane. The Looking Glass came in the next day. I saw from his countenance that something was wrong with him, and I immediately got a half-breed interpreter, in whom I could trust, on the track to overhear his conversations. That interpreter kept about him, and finally overheard a long conversation between the Looking Glass and a prominent Spokane chief, in which the Looking Glass proceeded to develop his plan to entrap and deceive me in his own country, amid the Nez Percés, and in which he

advised a similar course to the Spokanes. I never communicated to the Looking Glass my knowledge of his plans, but knowing them I knew how to meet them in council; I knew how to meet him in his own country, and it gave me no difficulty. In order, however, to be prepared for all possible contingencies, I exchanged all but four of my horses for the best horses of the country, giving in exchange the Indian goods that we had brought up for the contemplated Spokane council, and when I moved from the Spokane I had with me the best train of the season. I reduced transportation to twelve days, and the packs to eighty pounds, for I desired to be in a condition that if the Nez Percés were really hostile, and I was not strong enough to fight, I could make a good run, and then I struck for the Nez Percés country. The second day I met an express from Craig's, telling me that the Nez Percés were all right, and that the whole tribe would back me up. We moved towards Lapwai, and were four days in reaching that point, the distance being 108 miles. The weather was very disagreeable, being snowy and rainy. In about fifty miles from the Spokane we got upon our old trail to the Red Wolf's ground, which trail we followed for about twenty miles, and then keeping to our left passed to the mouth of the Lapwai, and thence to William Craig's place, on that stream. The banks of the Spokane, and pretty much the whole route from the Kamas prairie of the Cœur d'Alénes, is very well wooded; and the route towards Lapwai, for the whole distance, passes in the vicinity of a very well wooded country, except for about fifteen miles before reaching the Koos-koos-kia. My object not being to give an account of my Indian operations or of the Indian war, I will close my narrative at this point, referring you to my official reports should further information be desired in connexion with this trip. I will state that on my way into the settlements I remained in Walla-Walla valley some ten days, where I saw much of the Oregon volunteers. Went to the Dalles, in advance of my party, with three men, and, the river being closed by ice, went down from the Dalles to near Vancouver on the trail, and reached Olympia on the 19th of January. I intend at some future day to give a very full account of these large operations in the Indian service.

CHAPTER III.

GEOGRAPHICAL MEMOIR.

GENERAL REMARKS ON THE ROUTE NEAR THE FORTY-SECOND AND FORTY-NINTH PARALLELS, AND DESCRIPTION OF ITS WATER LINES, MOUNTAIN RANGES, PASSES, AND SOIL.

I now propose to present the following geographical memoir of the country along and in the general vicinity of the field of exploration of the northern route. Some significant facts will also be presented as regards the country both to the north and the south of this field. If we examine a map of the country we shall be struck by the fact that the line of the forty-seventh parallel is central to a vast region of the temperate zone, extending from the water line of the great lakes to the shores of the western ocean; that north of this route there is a vast area which, in similar latitudes in eastern Europe and in Asia, is habitable, productive, and, at this very moment, increasing in population. Besides these advantages, it is intersected by the only streams flowing either side of the water sheet of the continent of which any considerable use can be made for purposes of navigation. On the eastern slope, the Missouri, having its rise in many tributaries so graphically and truthfully described by Lewis and Clark, in about latitude forty-four and forty-five, with other tributaries flowing from different points of the rocky ridge, as far north, nearly, as our northern boundary; its principal tributary being the Yellowstone, which, with numerous branches, has its rise in the Wind river and lower mountain ranges to the east, their combined water flowing eastward and southward to its junction with the Mississippi until they find their final outlet in the Gulf of Mexico. The Saskatchewan, flowing eastward also in two main branches having their source in about parallels fifty and fifty-two, with tributaries coming a short distance from within our own borders, runs a great distance eastward, until, forming one stream, they flow into the waters of Lake Winnipeg, connecting northward with Hudson Bay. The Peace river, having its rise also near the parallel of fifty-three, flows finally into the Frozen ocean. Again, this domain has within itself the sources of the Mississippi, which, with its numerous tributaries, has a long course to the southward before joined by the waters of the Missouri; the Red River of the North, having its source in the very heart of Minnesota, not far from that of the Mississippi, and finally, with its numerous streams, some coming from the east, some from the south, and some from the west, flows more than four hundred miles northward within our own borders, and ——— miles northward still, until it joins the waters of Lake Winnipeg. Except the immediate field of my own explorations, of which a minute description will be given, I propose to describe only in general terms the country from the parallel of the city of Washington and San Francisco to Hudson Bay, the region alluded to, and to which the northern route is central. Whenever it may become necessary, I shall avail myself of other sources of information which may seem to me to be reliable.

The western slope of the continent, on this extended field, has but one large navigable river, the Columbia—a name most grateful to the ears of the American people, from its discovery by an American shipmaster. The Columbia, with its great southern tributary, the Snake river, drains an immense country, stretching from the 42d to the 53½d parallel. It has several tributaries, each affording more continuous navigation than any other stream on our western coast, except the Sacramento and the Colorado. Northward the rivers generally are innavigable; for Fraser's river, flowing to the ocean in about parallel 49° 07', is navigable only 120 miles. The upper half of this distance is difficult at all seasons of the year. Now, these two great rivers, the Columbia river and the Missouri, are on the direct line of the northern route, are central to the great regions under examination, and are navigable by steamers to points only 450 to 500 miles apart. If this great provision of nature be seconded by other auxiliaries and other bounties from the same hand, we have, added to the advantages of central position, a combination of natural gifts, which cause the route to be already almost prepared for the enterprise, the occupation, and the accomplishment of the great movements of the world. I have referred to the great lakes. The importance of these great lakes has now become second to that of no inland sea, either of the new or of the olden world. The extraordinary growth of cities on both their shores; the great grain ports, far exceeding the old grain ports of Europe; the great lines of railroad now in progress and rapidly approaching completion; railroads stretching through the Canadas, and now seeking their eastern terminus in the waters of the northeastern British Atlantic; the great lines of railroad stretching through the States, and already having termini at every point of commerce on our coast; the parallel lines in progress, still further to facilitate business and exchange—all show the vast, growing, commercial, and business interests around this great water line. This water line, moreover, has been improved by the people on both sides of the boundary. The genius of Clinton gave to New York her great canals many years ago. The Welland canal has enabled the Canadas to turn the Falls of Niagara, and the Sault St. Mary's canal has connected Lake Superior with the chain of lakes to the eastward; so that at this moment this water line, stretching halfway across the continent, has placed the extremest western parts of Lake Superior and Michigan in connexion with the ports of Europe. Vessels, without breaking bulk, can pass from those points to European ports; and yet new lines of canals are being projected to shorten the connexion between the Georgian bay and the waters of the St. Lawrence. This brief description of the general character of the region, as affected by water communications and in connexion with great existing railroad lines, is here given before entering upon a detailed description of the country. I have not thought it necessary to refer particularly to the mountain ranges which intersect this country. The great rocky range, from the point where it commences to separate the tributaries of the Columbia and the Missouri, far to the northward of the 56th parallel, has a general course north, 40° west. The divide commences on the 42d parallel, at the longitude of 109°, and wending westward to 123° longitude in the parallel of 56. In about parallel 45 a second backbone of the Rocky mountains leaves the main chain and courses a direction north, 25° west, crossing Clark's Fork at the Cabinet mountain, and proceeding in the same general direction to the waters of the Kootenay. This chain is known as the Bitter Root, Cœur d'Aléne, and Kootenay mountains, and is considered and described by Lewis and Clark as a portion of the Rocky mountains. Between the Bitter Root mountains and the next range, known in California

as the Sierra Nevada, and in Oregon and Washington as the Cascade mountains, is a great interior plain, denominated the plain of the Columbia, and which will be minutely described as we go on. The Cascade mountains have a general direction north and south, and are at an average distance from the coast of 120 miles. These mountains are generally high and rugged, having many snowy peaks, and with but one river stream from the Sacramento to the far north of Fraser's river, which really breaks through the mountains from the interior plains. The mouth of the Columbia, and the waters of Puget Sound, the Georgian bay, and the Straits de Fuca, will be referred to hereafter; but for harbors, the western terminus of this route, central to such a vast geographical area in the temperate zone, and central to the great water lines, canals, railroads, and seats of commerce of the eastern slope, is the most splendid roadstead, admitted in the opinion of all military and naval officers, and all commercial men, on the shores of all the oceans.

But to resume: This scheme of railroad connexions for the northern route connects with Lake Superior at its western end, and the waters of the Mississippi at St. Paul, the head of continuous steamboat navigation; and also, on its western terminus, a connexion both with the Columbia valley and the Puget Sound, over the Cascade mountains. Lake Superior is rapidly growing in importance. Its commerce, and particularly its steamboat business, more than double every year. Superior City, which is the most western point, has a large and capacious harbor, where the coming season steamers will arrive daily. Bayfield, on its southwestern shore, has also very extensive space for the secure anchorage of vessels, and, equally with Superior City, will be soon in railroad communication with the waters of the Mississippi. The Mississippi itself, above St. Paul, has flowing into it many tributaries having reaches of navigable waters. Even as long ago as 1853 steamers were running from Saint Anthony to Sauk Rapids.

The first obstruction to continuous navigation of the Mississippi is the falls of St. Anthony, situated 10 miles above the mouth of the Minnesota, in latitude 45° .

From above this to Sauk Rapids is 90 miles, and in sixty miles further occur four more rapids, which may, however, be easily removed, as they consist only of loose boulders, thus giving another long extent of navigable waters. Crow Wing river, which empties at this point from the west, has no obstruction except from movable boulders, and has a depth of at least four and a half ($4\frac{1}{2}$) feet up to its principal branch, Leaf river, a distance of about sixty miles by the windings, or twenty in a straight line. Leaf river decreases from four to two and a half feet in depth, in a winding course of seventy-five (75) miles to its origin in Leaf lake, from which, to Otter Tail lake, the source of Red river is less than two miles. Above the mouth of Crow Wing the course of the Mississippi is straighter, and changes suddenly to a NE. and SW. course. For 75 miles only one rapid is met with, and here is the outlet of Sandy lake emptying from the east, from which to the navigable part of the St. Louis river which empties into Lake Superior at Fond du Lac is but 30 miles in a direct line.

A number of small rapids occur above this lake, but it is believed that navigation can be made by steamboats for at least 35 miles further, to Pakegon Falls, about 200 miles by the numerous windings of the stream from its source in Itasca lake.

On the west side the principal branch to the north is the Crow Wing, through which there is the best connexion with Red river. South of this occur the smaller streams called Karishon or Crow river and the Sauk, each navigable for considerable distances, and the Red River of

the North—I am now referring to the upper branches of the Mississippi, those above St. Paul—is but one or two miles; and the whole country, in that general region, has great facilities for canoe communication. Numerous lakes and streams are found upon its surface, many of which discharge, during high water, in both directions, so that the early voyageurs found no difficulty in moving on many lines in their light canoes, with comparatively inconsiderable portages.

Many of the branches are navigable at present for considerable distance, thus affording excellent access to the fine timber which abounds in this region.

From the eastern side the principal branches are: the Rum, or "Iskodewabo," and the St. Croix rivers; the latter, emptying fifteen miles below St. Paul, is continuously navigable for sixty miles towards the northeast, when its falls occur. Above these it is probably navigable for small steamers for seventy-five or eighty miles, or within sixty miles of Lake Superior. Near St. Paul the Mississippi receives the waters of the Minnesota, which have their source near those of the southern branch of the Red River of the North. Big Stone lake, the source of the Minnesota, is only three miles from Lake Traverse, the source of the Bois des Sioux, tributary of Red river. Then, about latitude $45^{\circ} 10'$, its course suddenly changes at a right angle, and for the remainder of its course from its origin several falls and rapids occur. The Minnesota is now navigable by steamers to ——— miles from its mouth; and it is believed that its upper portions can be so improved that, by a through-cut from Big Stone lake to Lake Traverse, there may be continuous navigation from the waters of the Mississippi to the Red River of the North, and thence to Lake Winnipeg. North of our boundary the existing communication from Fort William to Lake Winnipeg is one essentially by water; but the governmental party which made the examination last year, and which are now continuing their exploration in that country, recommend, in their official report, the establishing a communication between Fort William, on Lake Superior, and Fort Garry, on the Red river, partly by a wagon road and partly on the waters of the line referred to; which, in their estimation, will cost some \$200,000. This view will show how extraordinarily well supplied with available streams and waters of communication is the country between the great lakes and the upper Mississippi, and thence to the waters of the Red River of the North. The State of Minnesota, in soil, salubrity of climate, and ability to support population, is not surpassed by any other portion of the North American continent. Its water advantages, in enabling its people to carry everything to market, are extraordinary. Its people are enterprising, and have taken up in good earnest the moving westward of the great lines of railroads which have not yet reached their eastern border. The extraordinary increase of population in the northwestern States—of Wisconsin, of Iowa, of Minnesota, and of Illinois—is the most convincing evidence how much they invite settlement, and of their resources, as great elements of power, commerce, and wealth, in a mighty nation. In the State of Minnesota much is being done in the way of establishing good wagon roads. Individual enterprise will, by next July, have a very excellent road open from Superior City, by Mille Lac, both to Madeira and to Crow Wing; and from Crow Wing the line will soon be taken up to the western border of the State. There is a road connecting Superior City with St. Paul. There is a pretty good natural road from St. Paul to the navigable waters of the Red River of the North. So we find both water lines and wagon roads to move through and occupy this State. Much of the larger portions of Minnesota, from Lake Superior to the Red River of the North, is heavily timbered. Here are very large

pineries; groves of oak, and elm, and ash, and maple; there are also the linden, cherry, beach, ironwood, birch, cotton-wood, spruce, hemlock, tamarack, arbor-vitæ or white cedar, and red cedar, in abundance, and fifteen other kinds of trees of less importance; of the maple, there are four; of ash, two; elm, three; oak, six; birch, two; cotton-wood or poplar, three; pine, four; and of spruce, four distinct species, varying in properties and appearance—making the *timber trees* thirty-four varieties. The soil is uniformly good. Winter wheat is raised with great success. E. Patch, a few miles north of the Falls of St. Anthony, raised, two years ago, forty bushels to the acre; it yields largely as far north as the 48th parallel. Corn is a certain crop as far north as 48°, and is raised north of 49°. The southern corn, commonly called the gourd seed, is generally cultivated as far north as Sauk Rapids. Near St. Paul sixty bushels have been raised to the acre. In no country do potatoes do so well, yielding commonly 200 to 400 bushels to the acre. The southern part of the State is strictly an agricultural region; the soil is a rich, sandy loam, with a clay sub-soil, and extends as far north as the Crow Wing river, where the pine belt commences, which follows up the Mississippi and its tributaries to their sources, with occasional intervals of maple, oak, spruce, birch, &c., &c.; at Red, Leach, and Cass, and at the lakes corn, wheat, and all other kinds of vegetables, are raised.

The past year the citizens exported hundreds of thousands of bushels of oats and potatoes, also a small quantity of wheat.

The valley of the Minnesota river is thickly settled, and the land yields all kinds of grains and vegetables. From this valley to the Red river, and from the latter, by the Otter Tail lake, to the Mississippi river, to Crow Wing, thence south to the northern line of Iowa, the country is thickly settled.

Minnesota is surpassed by no portion of the country for grazing purposes; the rich growth of wild grass everywhere to be found, the dryness of the atmosphere, and the lateness of the frosts in the fall, together with the small quantity of snow that falls during the winter, particularly adapts that State to the honor of the farmer and stock grower. The valley of the Red river as far north as the 51st parallel is rich, and produces wheat, barley, oats, potatoes, and vegetables, equal to any part of New York. Land in the vicinity of St. Paul has yielded ninety bushels of corn to the acre. Tobacco does well, and from the last year's experience it is believed that Minnesota will be able to compete with any of the tobacco-growing States of the Union. Sweet potatoes are raised in great abundance, and to be found in the principal market-houses. The western coast alone can compete with this State in raising vegetables. The Isabella, Catawba, and Clinton grape do well; large vineyards have been started. Wild apples, plums, and grapes everywhere abound, and it is believed that cultivated fruits will flourish, but as the smoke is yet issuing from the camp fires but recently deserted by the Indians, time has not been given to test its adaptation to the raising of fruit; 200,000 industrious whites now inhabit this State, which ten years ago had not fifty white families within its limits. What better test can be required of its adaptation to the wants of a laboring population? Iron ore is abundant, and in the northeastern portion of the State copper, silver, and other ores are found. Thus, looking to Minnesota alone, we have in the general vicinity of the northern route an area of 83,000 square miles, furnishing at least 53,000,000 acres of arable land, where all the vegetables and all the cereals obtain the highest perfection, and over a large portion of which the Indian corn also thrives.

The Red River of the North receives from the west many tributaries, of which the most important is the Wild Rice river, the Shayenne, the Maple, and Elm rivers. The Shayenne has its source near the 101st meridian, flows generally on a due east course about three degrees, then making a great bend to the southward from $47^{\circ} 40'$ of latitude, courses eastward along the parallel of $46^{\circ} 30'$ until it joins the waters of the Red River of the North. These rivers may be described as follows: Wild Rice river, the next towards the ———, arises south of the great bend of the Shayenne, and at the border of the Coteau des Prairies, then flowing in a winding course towards the northeast for about a hundred miles, joins Red river in latitude $46^{\circ} 48'$. The Bois des Sioux also arises at the foot of the coteau in a lake twelve miles long, called Lake Traverse, and after a course of thirty-five miles nearly straight towards the N.NE., joins Red river at latitude $46^{\circ} 20'$.

Lieutenant Pope found the average depth of this branch three feet, so that there seems to be no obstacle to a communication through it with the Minnesota, if a connexion is made between Lake Traverse and Big Stone lake above the mouth of this branch. Red river has a depth of from $2\frac{1}{2}$ to 4 feet, and is often called the Otter Tail, from the name of the lake in which it rises thirty miles nearly due east. These three streams uniting form a body of water but little larger than the Shayenne, with which it unites about latitude $47^{\circ} 10'$. Thence the course of Red river is nearly north until it crosses the boundary, and its depth increases from four to fifteen feet, the whole navigable distance from Lake Traverse being 462 miles, though it does not continue so for more than eighty miles north of latitude 49° , where falls and rapids occur.

Two of the most important landmarks west of the general region of the Bois des Sioux are the Coteau des Prairies and the Dead Colt Hillock, the former of which is described by Nicollet as follows: The basin of the upper Mississippi is separated from that of the Missouri by an elevated plain, the appearance of which seen from the valley of the St. Peters, (Minnesota,) or that of the Rivière Jacques, *looming* as if it were a distant shore, has suggested for it the name of "Coteau des Prairies." Its more appropriate designation would be that of plateau, which means something more than is conveyed to the mind by the expression a *plain*. Its northern extremity is in latitude 46° , extending south to 43° ; after which it loses distinctive elevation above the surrounding plains, and passes into rolling prairies; its length is about 200 miles, and its general direction N.NW. and S.SE.

Its northern termination (called Tete du Coteau, in consequence of its peculiar configuration) is not more than fifteen or twenty miles across; its elevation above the Big Stone lake is 890 feet, and above the ocean 1,916 feet. Starting from this extremity the surface of the plateau is undulating, forming many dividing ridges, which separate the waters flowing into the St. Peters and the Mississippi from those of the Missouri. Under the 44th degree of latitude the breadth of the coteau is about forty miles, and its mean elevation is here reduced to 1,450 feet above the sea.

The coteau itself is isolated in the midst of boundless and fertile prairies extending to the west, to the north, and into the valley of the St. Peters. Dead Colt Hillock is one isolated butte standing north of the extremity of this coteau, and probably at one time connected with it, as it has the same general structure. This butte was not raised, but others further west were found to rise 200 feet above the valley. The general region of the Bois des Sioux is very remarkable. It is a very extensive plateau, partly prairie and partly wooded, with a beautiful

timber growth on the streams which intersect it that separates the waters flowing into Hudson bay and those flowing into the Gulf of Mexico; and yet the divide is not perceptible to the eye. It is the natural key of railroad communications through Minnesota; and yet the Côteau des Prairies, which may be said to be its southern limit, is both a landmark and a barrier. The country between the western branch of the Shaysenne and the Red River of the North is unsurpassed for pasturage, furnishes a large portion of arable land, and yet to its limits is at times rolling and hilly, and a portion of the land is of inferior quality.

Westward from the region just described to the mouth of the Yellowstone, there are some general features which I will first refer to. The Côteau du Missouri stretches along the northern side of the Missouri river, separating its waters from the northern system of waters which have their outlet in Hudson bay. It presents to the eye of a voyageur the appearance of a distant coast, and so easy and practicable is it that one can move with heavy trains over nearly all portions of it. This côteau, in the vicinity of the Yellowstone, passes to the northward and westward into British territory, and continuing westward finally blends itself in the projecting spurs and main chain of the Rocky mountains, separating again the waters of the Missouri from the waters of the Saskatchewan. A great feature of the intermediate country is the Miniwakan, or Devil's lake. This lake is on the plateau of the Shaysenne, and is surrounded by swells and hills, varying in height from 20 to 250 feet.

The greatest extent of the lake is at least forty miles, but may be more, and is bordered on its south side by hills which are pretty well wooded. It is so filled up with islands and promontories that in travelling along its shores it is only by occasional glimpses that its great expanse is visible.

Its average breadth may be set down at fifteen miles, and its waters appear to be the drainings of the surrounding hills. It has no outlet towards Red river except by a depression, which in high water it may possibly discharge into the Shaysenne.

Its water is too brackish to be drank except by horses, which swallow it with avidity, and its color is a deeper green than the neighboring lakes, which are not salt. By analysis they were found to contain sulphates of soda, and of magnesia, (epsom and glauber salts,) and chlorides of soda, (common salt,) and magnesia.

Large fish of several kinds inhabit it.

In the vicinity of this lake and to its southward are many salt lakes, and there are from time to time saline effervescences on the soil; but there are always numerous ponds of fresh water, and my own experience and that of the voyageurs of the country is, that fresh water will always be found, at short distances apart, either for camps or for the use of settlements. The country immediately to the southwest of the Miniwakan lake, and in the general vicinity of this saline region, is the most indifferent that is met with coming from the east. The James river has its source near the eastern border of this region, in about latitude $47^{\circ} 40'$, and flowing in a southerly course finds its way to the Missouri a great distance above its confluence with the Mississippi. From the head of James river to the nearest point of Mouse river is seventy-five miles. Mouse river has its source in British territory, flows below our boundary a hundred miles east of the meridian of the Yellowstone, finally reaches nearly to the 48th parallel, and then, flowing to the northwestward, joins its waters with those of the Assiniboine river, which again flows into the Red River of the North. The Mouse has no considerable

tributaries from the south, and the information which Lewis and Clark derived from voyageurs that its source was within one or two miles of the Missouri, is erroneous. From the Côteau du Missouri a great many little streams trickle down, gather up water, and pass into Mouse river; but it has between it and the côteau a broad, open, beautifully *grassed* valley, with plenty of wood in all the coulées which border these numerous streams. Opinions differ on the part of voyageurs as to whether Mouse river is to any considerable extent navigable, but all concur in the judgment that there is a large quantity of fine arable land to the north, and they all speak of the heavy forest growth in its general vicinity, known as the Bois des Chipewas. In the Mouse River valley is found the trail from the Pembina settlement to the mouth of the Yellowstone. This portion of country is described by the voyageurs, many of whom I met and conversed with concerning it, as being well grassed, well watered, and a large part of it well adapted to farming. This is notoriously the case with the country on the Assiniboine in immediate connexion and to a short distance north of it. Indeed, there is but little country between the Red River of the North and the Mouse River valley which is not adapted to almost continuous settlement; for I hold that when a country is so well watered, and its arable and grazing lands are in such connexion, small farms can be opened over nearly the entire surface for the sustenance of man; that such a country is a cultivable country. The term "small farms" is used in contradistinction with large farming operations or plantations where the owner has to employ many hands. I have to say, therefore, that over this country you can plant farms of from 160 to 640 acres, furnishing all the arable and grazing land required to make agriculture profitable.

The Mouse River valley has a general elevation of 1,400 to 1,800 feet, being about the same height with the corresponding valley of the Missouri. Its most western tributary is the River of the Lakes, which passes along the northern side of the Côteau du Missouri, and furnishes a line of gentle ascent to cross the côteau. On this tributary are found specimens of lignite. The côteau itself, between the Mouse River valley and the mouth of the Yellowstone, has a height of about 200 to 400 feet above the former valley, and its general width may be estimated at 35 miles. The country immediately north of Fort Union to the White Earth river is much of it of a very indifferent character, furnishing some grazing. The grazing, however, gradually improves, and is quite good for twenty to thirty miles below our parallel. None of the streams in this general vicinity, the White Earth river, the Sandy creek, and the Little Muddy, are navigable, and on their banks are but scattered groves of wood. They are almost entirely dried up in the summer season, affording, however, water for camping purposes. There are some lakes in this genial region, and many in the côteau itself. The voyageurs of the country state that there are numerous lakes all along the côteau as far as James river, and it is unquestionable that they will supply any deficiency of water along the salt water region south of the Miniwakan lake. There is no doubt, however, that this portion of the route can be readily supplied by means of artesian wells. It may be estimated that fifty miles of the country on and in the neighborhood of this côteau is not continuously cultivable. There are through it, as in the region referred to south of the Devil's lake, many spots of good land, in the valleys of the streams, on the shores of the lakes, and in the hollows and depressions of the country.

The mouth of the Yellowstone is a great landmark throughout this whole country, and, in geographical position and importance, is worthy of special mention. Here the two great

branches of the main trunk of the Missouri come together ; to this point, and sometimes above it, steamers of from four to six hundred tons have come from St. Louis every year for the last twenty-five years ; and it may become hereafter a depot for supplying the Salt Lake, by the line of the Yellowstone, which is navigable for boats, and possibly for steamers, to above the mouth of the Big Horn, a distance of about two hundred miles. The character of the Missouri above Fort Union will be referred to more specifically hereafter. It may be said here, however, that its waters are navigable for steamers to within less than one hundred miles of the divide of the Rocky mountains.

The general region of country thus far described is between the 92d and the 104th degrees of longitude, an air-line distance east and west of 575 miles. The dividing ridge of the Rocky mountains and the scope of country included within the purview of the northern route is in the 112th degree of longitude, on the parallel of 46° , taking a northwesterly direction to the 115th degree of longitude, in parallel 49° .

The Missouri may be described as follows : It has its source in three main tributaries, the Gallatin, Madison, and Jefferson forks, between the 44th and 45th parallels. These streams, by their junction, form the Missouri, in about latitude $45^{\circ} 24'$, and longitude $110^{\circ} 40'$. Thence the general course of the Missouri is northward, ranging within from twenty-five to sixty miles of the divide of the Rocky mountains, when it breaks through a somewhat difficult projecting spur of the same, at a point denominated by Lewis and Clark the Gate of the Mountains ; continuing then to the northward, and soon varying to the eastward, we come to its Great Falls, which may be described as follows : They consist of five principal cascades, commencing three miles below the mouth of Sun river, and extending for $11\frac{1}{2}$ miles, with intervals of rapids between them. The entire fall amounts to 160 feet, and varies from 5 feet at the second pitch to 76 feet in the last, the first being 25, the third and fourth 42 and 12 feet, respectively, so that the increase is nearly in geometrical progression from the least to the greatest.

The banks are high and abrupt on both sides, intersected by ravines, but opposite the fall on the north side a strip of rolling prairie runs near the river and breaks off in terraces to a small bottom below the cascade, from which to Fort Benton a passage along the river bank can be made practicable by cutting through some projecting bluffs. Thence its general course is nearly due east, until we reach Fort Union. From the Great Falls to Fort Benton, a distance of 30 miles, it gradually widens ; and here are more and larger points of bottom land on its banks, to Highwood creek, which flows into it from the south 15 miles below the Great Falls. The Highwood has a large extent of fine arable land, suitable for a military post, and is probably about the head of navigation. About five miles below the fort there is a rapid having but fifteen inches of water—this is the shallowest point—the next being twenty inches deep, and varying from this to twenty-six inches. Two or three points occur where there are large moveable rocks, until the mouth of the Muscle Shell is passed.

This is especially the case at "Dauphin's" rapids, 16 miles below the mouth of Dog river, where in addition there is a current of $4\frac{1}{2}$ miles per hour. The current is stronger here than at any other point on the river. This refers to the river between the 20th and 30th September ; earlier in the season, when the tributaries are supplied from the melting of the snow in the mountains, its depth is much greater ; in the month of June it has three feet more water ; from the first of August to the middle of September it falls very gradually ; and upon the first

of September its depth is about one foot greater. This rise and fall of the river is very regular, and it is but little affected by the accidents of the weather. During the high water the current is very rapid and severe, and the small rapids are lost sight of. As to the large rocks, sometimes found in the channel, they are brought from high up the river by the ice as it goes out when the river breaks up. During the winter they become attached to the under surface of the ice, and in its removal they are taken along till they are rubbed off by some gravel bar, or fall down by the melting of the ice; the next season, if on a bar and near the surface, they again become frozen up with the ice, and are moved further down. Thus they are constantly working their way down the river, and a bar that this season is encumbered by them may be free the next. From the Muscle Shell downward towards the mouth of the Yellowstone the river changes. The water gradually becomes muddy from the washing away of the banks; the channel is constantly shifting its position; the forests of cotton-wood with which the banks are lined, falling into the river, causes numerous snags and sawyers. Below the Yellowstone the Missouri assumes the same character it manifests to its mouth, it becomes thick and muddy with the alluvial deposit it is ceaselessly bearing on to the Gulf of Mexico. The bed of the river is much broader; the waters separate into many different channels, forming numerous sand islands, sometimes covered with forests of cotton-wood. Referring to the navigation of the Missouri, it may be observed that, as regards the shallowest rapids, owing to the peculiar nature of the bottom, it being a mixture in many places of quicksand and fine gravel, it would give way very readily to the action of the paddle wheels, and admit of the passage of a boat drawing a greater amount of water than is actually found upon the bar. In order to take advantage of the rise of the water, the service should be so organized as to have two lines of steamers, one running from St. Louis to the mouth of the Yellowstone, and the other from that point to Fort Benton. The steamers which navigate the first portion of the river draw from three to four feet of water, and carry some five to six hundred tons of freight, and have ascended as high up as the mouth of the Milk river. The navigability of the rapids could be so far improved, by removing the boulders and stones now obstructing the stream at the points referred to, that steamers drawing two feet of water and carrying from 200 to 250 tons could reach Fort Benton at the lowest stage of the river. This improvement would consist altogether in the removal of detached masses of rock, and could be easily done at low water and at small expense. The kind of steamers best adapted for the river are side-wheel steamers, with two separate, disconnected engines, as such boats will more easily turn the sudden curves than any other kind. The river from St. Louis to Fort Union has many snags in it, but during the 25 years the American Fur Company have navigated it they have never lost a boat from that cause. From Fort Union to Fort Benton there are but few snags, and the only obstruction is the rapids. There is plenty of wood for fuel all the way from St. Louis to within 200 miles of Fort Benton, but within that distance, for a space of about 100 miles, wood is scarce, though it can be had at a few points. The river may be considered navigable through its whole extent for seven months of the year. The ice at the coldest section of the river, say Fort Union to Fort Clark, on an average of a term of years, will commence making so as to obstruct navigation about the 20th of November, and would break up about the 10th of April; the distance from St. Louis to the mouth of the Yellowstone is 1,887 miles; to the mouth of Milk river 2,067½ miles; to Fort

Benton 2,415 miles; to the mouth of the Highwood creek 2,430 miles; and to the Great Falls 2,445 miles,

The Missouri has numerous tributaries from the north. Commencing at Fort Union, one of the most important is the Big Muddy, which has its rise probably near our parallel; has a generally south course, with a fine body of arable land on its banks, and finds its junction with the Missouri in the midst of a large forest of cotton-wood. In 117 miles from Fort Union by the wagon road we reach the mouth of Milk river, after passing many tributaries between it and the Big Muddy. Milk river is described by Lewis and Clark, and has been laid down on all the maps until within comparatively a recent period as having a due north and south course, its source being in British territory; its course is nearly east; west for one hundred and eighty-five miles near the parallel of $48^{\circ} 30'$, and it affords a remarkable river valley, looking to its own resources, as well as a good approach to the mountain passes. The Milk river has several inconsiderable tributaries, both from the north and south; but it has its rise in the main Rocky mountain range immediately southeast of Chief Mountain lake, and between latitude $48^{\circ} 50'$ and $49^{\circ} 15'$, whence it flows a little to the north of east for about 100 miles, then, turning to the southeast in longitude $111^{\circ} 45'$, runs for 120 miles until it takes its eastern direction to the Missouri, which it follows for 85 miles, crossing the boundary in longitude $110^{\circ} 30'$ north of the line of the Missouri and Milk river to the divide of the Rocky mountains. The country is a rolling prairie; no mountain ranges are visible, except the Three Buttes, which rise up three thousand feet out of a plain one hundred miles east of the mountains, in about latitude $48^{\circ} 50'$. Between the Milk river and the Missouri there are two upheavals—the one is the Bear's Paw, which nearly fills up the country between these two rivers, 160 miles east of the divide, east of which is a less considerable upheaval—the Little Rocky mountains. The Bear's Paw is an exceedingly difficult country, although it is intersected by trails easy for pack mules, and said to be practicable for wagons, which are well known to the voyageurs of the country. The Little Rocky mountains, as well as the Bear's Paw, have an abundance of thrifty and available pine. They occur in localities and in bodies which will make it easy to supply the surrounding country. This region, from the Bear's Paw to the north of Milk river, between the Missouri and the Milk, is an exceedingly fine grazing country. It is well watered by the streams flowing into it, Milk river and the Missouri. It is a great resort for game. The buffalo is found here in very large numbers, as well as on the Milk river itself. The Milk river, from the Bear's Paw to near its mouth, is both the summer and the winter home of the Gros Ventres tribe of the Blackfeet nation. This tribe numbered in 1855 two thousand five hundred and twenty souls, and owned, at least, three thousand horses. It is unquestionable that from Fort Union, all along the general region of the Bear's Paw, the country is generally cultivable. Locations can be made by small farmers throughout its extent, and a thrifty and hardy population will grow up. There will be no difficulty about supplying such a population with water, or with wood for buildings; for the Missouri itself from the Gate of the Mountains can carry down the timber required for a considerable population. From the Bear's Paw to the Rocky mountains the great feature of the country is, first, the extension of the plateau to the base of the mountains, and the comparatively gentle and gradual approach which it furnishes; and, second, the extraordinary network of streams which, passing down from the

main chain, form by their several junctions the southern tributary of the Saskatchewan, Milk river, Marias river, Teton river, Sun river, and Dearborn river.

The numerous branches of the Milk, Marias, Teton, and Sun rivers all have beautiful and fertile valleys, while, even in the mountains, numerous rich prairies are met with, and the hills themselves are often covered with fertile soil. The character of the country is even better for agricultural purposes close to the mountains than further off. In the vicinity of Birch and Badger rivers it was beautiful, and even in May covered with a luxuriant green turf and numerous flowers, the soil being a dark loam. The main stream of the Marias came from a gap in the mountains, ten or fifteen miles in width, the valley partially timbered and partially rich prairie. This stream, evidently not the one explored by Mr. Tinkham, seemed to lead through the true Marias Pass; going up the valley for several miles he still found it wide, and without any apparent obstruction towards the west, while the stream continued so deep that he found a ford with difficulty.

The valleys of the numerous streams he crossed, between Sun river and the upper streams of Milk river, occur so close together that there can be no deficiency of water; not only the valleys but a great part of the upland is arable. Sun river, with its south fork, called Elk Fork, eight streams running into the Teton, seventeen tributary to Marias, and ten sources of Milk river were crossed in this interval of 140 miles, having each an interval of half a mile to ten miles in width, with an abundance of excellent timber in close proximity.

Coursing along under the eastern base of the mountains, in the months of May and June, you constantly cross these little streams, having a volume of water, showing that they have a considerable course over a country much of it arable, and all decked out in the gayest flowers of spring. The "Mo-ko-un," or Belly river, a tributary of the Saskatchewan, has its rise in Chief Mountain lake, under the 49th parallel, which is fed by several tributaries, whose most southern source is about latitude $48^{\circ} 30'$. About the Chief Mountain lake, in the neighborhood of these several tributaries and to the eastward, is much arable land.

Standing on one of the elevated mountain peaks near this lake, and looking to the northeast upon the country through which passes this tributary of the Saskatchewan, a vast plain, or more properly a prairie, is spread before the eye for more than fifty miles, for in richness of soil, luxuriant vegetation, and bright colored flowers, it closely resembles the prairies of the western States. The river next in size to the Milk, on the northwest side of the Missouri, is the Marias, which, rising in the Rocky mountains about latitude $48^{\circ} 30'$, runs a little south of east for about one hundred and sixty miles in a direct line, though much more by its windings, and empties into the Missouri eleven miles below Fort Benton. It is supposed to be navigable for small steamboats for fifty miles, forming the extreme of water communication towards the northwest in longitude $111^{\circ} 30'$. About a mile above its mouth it receives the Breast or Teton river, which, flowing from the mountains near latitude 48° , has a more winding but general easterly course for about one hundred and thirty miles, and is a smaller stream than the Marias. The next met with is Medicine or Sun river, which, rising also in the main range about latitude $47^{\circ} 30'$, pursues a nearly direct course eastward for eighty miles, discharging into the Missouri three miles above the Falls. About fifty-five miles from its mouth it receives Elk Fork from the mountains a little south of west, up which a good approach can be made to Lewis and Clark's or Cadotte's Pass. Crown Butte creek is a stream not more than fifteen miles long, which rises near the

hill of that name, and running eastward empties into a lake, together with a smaller stream from the south. Its outlet runs only a short distance and then sinks into the ground five miles from the Missouri, between Sun river and Beaver creek. The Dearborn, rising in the main chain, about ten miles southeast of Elk Fork, runs first northwestward for ten miles, and then turning to the southeast flows nearly parallel to the dividing ridge for twenty miles, receiving a tributary from both Lewis and Clark's and Cadotte's Passes, when it gradually curves round to the east, and twenty miles further empties into the Missouri near latitude $47^{\circ} 09'$. Two miles from its mouth it receives from the northwest Beaver creek, a stream not more than forty-five miles long, and running also nearly parallel to the dividing ridge. These two streams, together with the broken character of the country adjoining their lower portions, make an approach from the Missouri difficult above Sun river.

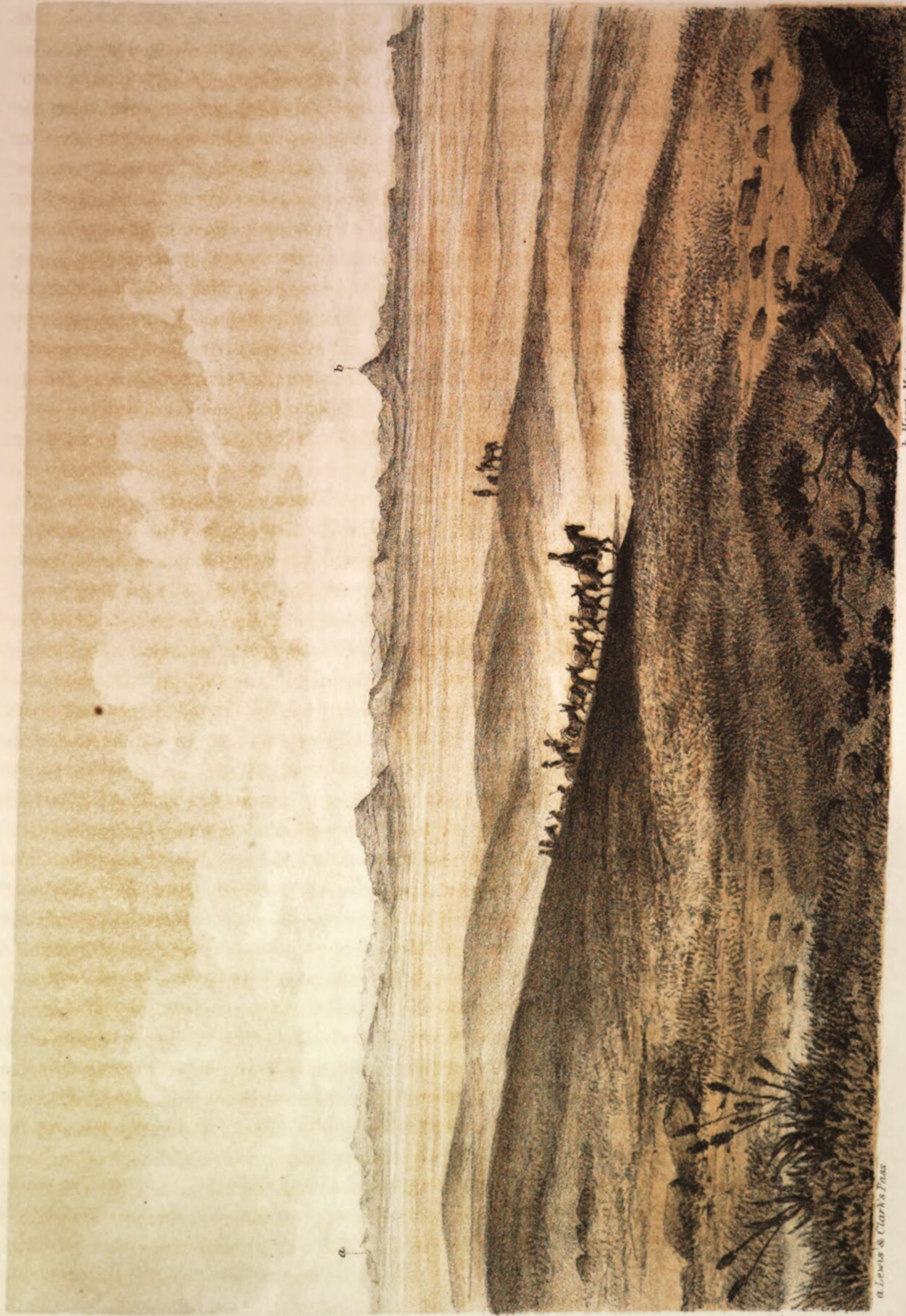
Twenty-eight miles southeast of Cadotte's Pass rises Little Prickly Pear creek, and, taking a crooked course towards the northeast for about twenty-five miles, empties into the Missouri thirteen miles above the Dearborn. Its valley forms a part of the approach from Fort Benton to the Hell-Gate passes. The principal Prickly Pear creek, however, rises by several heads from the Blackfoot passes and vicinity, and, running more towards the east for about twenty-five miles, empties into the Missouri above the "Gate of the Mountains," and eighteen miles southeast of the preceding stream. It forms part of the approach to these passes from the head of the Muscle Shell by the route explored by Lieutenant Mullan, in September, 1853.

No large stream runs into the Missouri above this stream until the three great forks, called by Lewis and Clark Jefferson, Madison, and Gallatin, are reached, about sixty-eight miles to the southeast. These three rivers, of nearly equal size, form the sources of the Missouri flowing from the lofty mountains which almost encircle its headwaters towards the west, south, and east. Only the Jefferson Fork has, however, been traced to its sources, which were found by Lieutenant Mullan in the vicinity of Big Hole prairie and pass, where there is an excellent communication with the Bitter Root valley at its head near longitude $113^{\circ} 50'$, and another pass to Deer Lodge prairie, sixty-five miles further east. Captain Clark followed it down in a canoe, through its very winding course for about eighty-five miles in a direct line to where it joins Madison Fork. The Muscle Shell is the principal river which enters the Missouri on the south side, joining it near longitude 108° . It rises in the Girdle mountains in latitude $46^{\circ} 30'$, longitude about 110° , and running eastward for about one hundred and sixty-five miles, turns a spur of the Judith range and takes a general northeast course for ninety miles to its mouth. When crossed by Lieutenant Mullan, at least one hundred miles above its mouth, it was forty or fifty yards in width and from two to four feet deep, with a very rapid current. This was in the dry season in September. Judith river is the next, emptying about eighty-four miles west of the Muscle Shell, and rising by numerous branches in the Girdle and Judith ranges between which it runs, having a course generally north for about sixty miles. From the frequency of its branching, it does not seem likely to be useful for the purposes of navigation. Arrow river, which empties nine miles west of it, also rises by three branches in the Highwood range, a spur of the Girdle mountains. Its sources are not more than thirty-five miles from the Missouri, and it can only be serviceable for rafting. The next streams on this side are above Fort Benton. Shonkin creek is a small prairie stream, rising near the Highwood range, and running northwest empties nearly opposite the fort. Highwood creek has the same origin and general course, but is a

larger stream, emptying twenty miles southwest of the fort. It is the stream by which the Fur Company obtain their lumber from the mountains. Belt Mountain creek empties six miles higher up, and has the same general course, but is a larger stream, and probably rises much further up, or perhaps within the basins lying beyond the Girdle mountains. At its mouth Mr. Tinkham found some difficulty in selecting a place shallow enough for his mules to ford in November. Its navigation, if any, is, however, cut off from that of the Missouri by rapids below its mouth. Smith's river, still further above the Falls, is said by Lewis and Clark to be eighty yards wide at its mouth, and as flowing through a charming valley from the southeast, visible for twenty-five miles before it was hidden by mountain spurs. It is supposed to be the same stream struck near its source by Lieutenant Mullan in going west from the Muscle Shell, about eighty miles southeast of the Missouri, where it had beautiful green meadows in its valley, which is there from a mile to a mile and a half wide, the stream fifty feet in width, and having many tributary branches and valleys. He travelled down its course for a day, finding it to improve as he descended it.

The Blackfeet have often desired to have farming locations. Through this region are many landmarks which will attract the especial attention of the voyageur. South of the Missouri, the Highwood, Girdle, and Judith mountains furnish an inexhaustible quantity of mountain pine, and make the southern limit of the plateau. Besides these, there are prominent buttes near the line of travel, often of striking and fantastic forms, such as the Boque d'Otard, Knee, and Trunk, between the Marias and Teton; the Oksut, south of the Teton; the Big Knees, Crown Butte, and Bird Trail rock, near Sun river; and Heart mountain, near the sources of Elk Fork. There is much excellent land and abundant groves of cotton-wood on these many streams. The plateau itself is arable in many portions, though not often continuously so. There is no reason why Indian corn should not attain great perfection throughout the whole country from Fort Union to near the divide of the mountains, that is, to Medicine river. There is nothing to prevent a good crop of any of the cereals. Vegetables of all kinds will thrive here. This is an extraordinarily fine grazing country. The quantity of buffalo who find their sustenance over this plateau, and thence down to Fort Union, is almost inconceivable. The winter homes of the Blackfeet, some six to seven thousand in number, are on the Teton, the Marias, and Milk rivers. They are the owners of great numbers of horses, and they find sustenance for their animals and food from the buffalo through the winter. It has been the habit of the fur companies to have winter posts on Milk river at the point known as Hammell's Houses, and also at the forks of the Marias river. So we have all the results of their twenty-five years' observation for the estimate of the number of Indians and the mode of their sustenance, as well as how their animals thrive. The country in the vicinity of the Girdle, Belt, and Highwood mountains, and thence southward along the upper waters of the Missouri and of the Muscle Shell, to the three forks of the Missouri and the extreme upper waters of the Yellowstone, abounds in wood, is well grassed, and furnishes arable land. About the forks of the Missouri there are rich, extensive, and beautiful prairies, which are described by Lewis and Clark as follows, they having reached this point on their upward voyage on July 27, 1804:

Here the country suddenly opens into extensive and beautiful meadows and plains, surrounded on every side with distant and lofty mountains. On the right side of the Missouri a high, wide, and extensive plain succeeds to this low meadow, which reaches the hills. In the meadow a



ROCKY MOUNTAINS - LOOKING WESTWARD -

large spring rises about a quarter of a mile from this southeast fork, into which it discharges itself on the right side. Between the southeast and middle forks a distant range of snow topped mountains spread from east to south above the irregular broken hills nearer to this spot. On the middle fork the low grounds are several miles in width, forming a smooth, beautiful green meadow. Between these two forks, and near their junction with that from the southwest, is a position admirably well calculated for a fort. An extensive plain lies between the middle and southwest forks which is more serpentine in its course than the other two, and possesses more timber in its meadows. This timber consists almost exclusively of the narrow-leaved cottonwood, with an intermixture of box-elder and sweet willow. Nearly all around us are broken ridges of country like that below, through which these united streams appear to have forced their passage. On Captain Clark's route from the forks of the Missouri, in 1806, to the Yellowstone, across a spur of the Belt mountains, he found the distance forty-eight miles, the greater part of which is through a level plain; indeed, from the eastern branch of Gallatin river, which is navigable for small canoes, the distance is not more than eighteen miles, with an excellent road over a high dry country, with hills of inconsiderable height and no difficulty in passing.

My attention was early given to the character of the country between Fort Benton and the emigrant route by Fort Laramie and the South Pass, and I became satisfied that it was entirely practicable, easy for wagon or pack roads, much of it wooded and generally arable and grassed. It was reported by Indians and voyageurs to be well watered. This conclusion of mine in 1853, and the judgment which I then formed that the country ought to be examined in order to establish the connexion between our northern passes and the great emigrant trail by the South Pass, thus far seems to have been verified so far as the explorations have progressed. Lieutenant Warren has examined the country for some 175 miles north of Fort Laramie, and thence to the eastward, and has found a country similar to the wooded country, soon to be described, on the northern route, having large quantities of fine pine and much arable and grazing land. It is to be hoped that this efficient and enterprising officer will be intrusted with a thorough examination of the country and the establishment of the connexion. The Black Hills, which have been a great bugbear to geographers and to voyageurs not acquainted with them, are inconsiderable, and portions of the country which have been laid down even on the maps of climatologists as barren and sterile, are pronounced by geologists who pass over them, as being arable.

Fort Benton is 2,780 feet above the sea, and Fort Union 2,019 feet. Thus the general rise of the country between these two points, a distance along the 48th parallel of latitude of 306 miles, is 761 feet, and the rise from Fort Benton to what may be deemed the western edge of the plateau is 1,630 feet on a distance of eighty-one miles. It is somewhat difficult to form a general estimate as to the quantity of arable land in this region. Nothing but the detailed surveys of the land office can furnish minute data; but the eye of the experienced observer going over a country can discern whether it is adapted to agriculture or to grazing, or to a union of the two; whether it can be occupied in the small farms previously alluded to or simply by ranches, having about them flocks and herds. This whole country would be a fine country for stock, for horses, and especially for sheep. In a meteorological paper which follows, the climate, constituents of the soil, and the snows of winter, will be presented; but we will now pass on to the consideration of the Rocky mountain region. This region stretches from the 111th

meridian to the 117th meridian on the 47th parallel, and both north and south has a generally northeast and southwest direction. I have already referred to the good arable country on its eastern slope.

On the western slope the following description from Lewis and Clark will show the delightful and promising character of the country. When encamped in the Kookooskia valley on May 17, 1805, they say: "The country along the Rocky mountains, for several hundred miles in length and about fifty wide, is a high level plain, in all its parts extremely fertile, and in many places covered with a growth of tall, long-leaved pine. This plain is chiefly interrupted near the streams of water, where the hills are steep and lofty, but the soil is good, being uncumbered by much stone, and possesses more timber than the level country. Under shelter of these hills the bottom lands skirt the margin of the rivers, and though narrow and confined are still fertile and rarely inundated. Nearly the whole of this wide-spread tract is covered with a profusion of grass and plants which are at this time as high as the knees. Among these are a variety of esculent roots, acquired without much difficulty, and yielding not only a nutritious, but a very agreeable food. The air is pure and dry, the climate quite as mild if not milder than the same parallel of latitude in the Atlantic States, and must be equally healthy, for all the disorders which we have witnessed may fairly be imputed more to the nature of the diet than to any intemperance of climate. This general observation is, of course, to be qualified, since in the same tract of country the degrees of the combination of heat and cold obey the influence of situation. Thus the rains of the low grounds near our camp are snows in the high plains, and while the sun shines with intense heat in the confined bottoms, the plains enjoy a much colder air, and the vegetation is retarded at least fifteen days; while at the foot of the mountains the snows are still many feet in depth, as that within twenty miles of our camp we observe the rigors of the winter cold, the cool air of spring, and the oppressive heat of midsummer. Even on the plains, however, when the snow has fallen, it seems to do but little injury to the grass and other plants, which, though apparently tender and susceptible, are still blooming at the height of nearly eighteen inches through the snow. In short, this district affords many advantages to settlers, and if properly cultivated would yield every object necessary for the subsistence and comfort of civilized man." Proceeding eastward they reached one of the Kamas prairies on the Kooskooskia, within the spurs of the Bitter Root mountains. There they encamped in a point of woods bordering the extensive level and beautiful prairie, and as the camas was in blossom, it being the 10th of June, the surface presented a perfect resemblance to a lake of clear blue water. The country, though hilly around them, was generally free from stone, extremely fertile, and well supplied with timber, consisting of several species of fir, pine, and birch. Thus we have now to describe a mountain region whose western slope is described by Lewis and Clark as extremely fertile, and which is *known* by the late explorations to be extremely fertile, and is bordered on the east by an exceedingly well watered and mostly arable region, whose southern portion has also been described by Lewis and Clark as fertile and beautiful.

It will thus be seen that the mountain system lying between the plains of the Missouri and the great plain of the Columbia is denominated by Lewis and Clark as the Rocky mountains, but which, in my narrative, has been spoken of as the Rocky mountains and as the Bitter Root and Cœur d'Aléne mountains. Indeed, this mountain system consists of two backbones. The

Rocky mountain chain, passing north from the sources of Snake river, branches off in about latitude $45^{\circ} 30'$ and longitude $113^{\circ} 45'$. One branch moves to the east and northeast, about ninety miles on the parallel. The other branch moves to the west and northwest about forty-five miles, also on the parallel. The two branches then continue in about the same general direction, north 40° west, and at a distance apart of about one hundred and thirty-five miles on the parallel. The western backbone, or the Bitter Root and Cœur d'Aléne mountains, decline somewhat in their northern course, so that on reaching Clark's Fork the chain becomes much broken and the system confused. It may be said to cross Clark's Fork at about the Cabinet mountain, and then it changes its course more to the west, forming the divide between Clark's Fork and the Kootenay river. The main range of the Rocky mountains which, between the source of Snake river and the three forks of the Missouri, has a high altitude, and continues to be elevated along the region whence the Jefferson Fork has its source, begins to fall soon after it branches to the east. The divide has a singular course from this point; it makes a great bend to the east and a return again to the west, making nearly a semicircle, from which flow streams to the Clark's Fork of the Columbia. The semicircle commences at the Big Hole prairie, where you pass from the Bitter Root river to the upper tributaries of Wisdom river, and may be said to end at the Gates of Sun river. Its radius is eighty miles, and its periphery one hundred miles, the centre being near the junction of the Hell-Gate and Bitter Root. Through this entire distance the whole chain is broken down, affording great numbers of passes, all of them having an altitude not far from 6,000 feet above the sea. Going north from the Gate of Sun river the mountains rise in elevation, so that when we come to our parallel the height of the passes exceeds 7,000 feet above the sea; and when we go further north to the 52d or 53d parallel of latitude, the divide exceeds 10,000 feet above the sea. It is the country, therefore, between these two great backbones of the Rocky mountains which I wish now to describe, and especially will I first call attention to that beautiful region whose streams, flowing from the great semicircle of the Rocky mountains, before referred to, pass through a delightful grazing and arable country, and find their confluence in the Bitter Root river, opposite Hell-Gate.

From the Big Hole prairie, on the south, flows the Bitter Root river, which has also a branch from the southwest, up which is a trail much used by Indians and voyageurs passing to the Nez Percés country and Walla-Walla. This trail was used in the exploration by Lieutenant McFeely and Mr. Tinkham, and has since been used very much by my expressmen and trains. The Bitter Root valley, above Hell-Gate river, is about eighty miles long and from three to ten in width, having a direction north and south from the sources of the Bitter Root river to its junction with the Hell-Gate. Besides the outlet above mentioned towards the Kooskooskia, which is the most difficult, it has an excellent natural wagon road communication at its head, by the Big Hole Pass to Jefferson Fork, Fort Hall, and other points southward, as well as by the Hell-Gate routes to the eastward. From its lower end, at the junction of the Hell-Gate, it is believed that the Bitter Root river is, or can be made, navigable for small steamers for long distances, at least, thus affording an easy outlet to its products in the natural direction. Hell-Gate is the *debouche* of all the considerable streams which flow into the Bitter Root, eighty-five miles below its source at the Big Hole divide. The distance from Hell-Gate to its junction with the Bitter Root is fifteen miles. It must not be understood from the term Hell-Gate that here is a

narrow passage with perpendicular bluffs; on the contrary, it is a wide, open, and easy pass, in no case being less than half a mile wide, and the banks not subject to overflow at all. At Hell-Gate is the junction of two streams; the one being the Hell-Gate river and the other the Big Blackfoot river. The Hell-Gate itself drains the semicircle of the Rocky mountains from parallel $45^{\circ} 45'$ to parallel $46^{\circ} 30'$, a distance on the divide of eighty miles. The main stream of the Hell-Gate has its source in the Rocky mountains in parallel $46^{\circ} 30'$, longitude $112^{\circ} 30'$, and pursuing nearly a northerly course for sixty-five miles then receives the waters of the Little Blackfoot river, and continuing in the general direction north 50° west for forty-eight miles, receives the waters of the Big Blackfoot. The upper waters of this river connect with the Wisdom river, over a low and easy divide, across which Lieutenant Mullan with his party moved on December 31, 1853. Moving down this valley fifteen miles, we come to a most beautiful prairie known as the Deer Lodge, a great resort for game, and a favorite resting place for Indians—mild through the winter, and affording inexhaustible grass the year round. There is a remarkable curiosity in this valley—the Boiling Springs, which have been described by Lieutenant Mullan. This Deer Lodge prairie is watered by many streams, those coming from the east, having their sources also in the Rocky mountains divide, and those coming from the west in the low, rolling, and open country intervening between the Hell-Gate and Bitter Root rivers. The Little Blackfoot, which has been referred to, is one of the most important streams in the line of communication through this whole mountain region. It has an open, well grassed, and arable valley, with sweet cotton-wood on the streams, and pine generally on the slopes of the hills; but the forests are quite open, and both on its northern and southern slopes there is much prairie country. The divides between the Little Blackfoot and Big Blackfoot, as well as between it and the tributaries to the south, are low, grassed, and much of them arable. The Little Blackfoot river furnishes two outlets to the country to the east. It was the southern one of these passes, connecting with the southern tributary of the Prickly Pear creek, that Mr. Tinkham passed over in 1853, and determined a profile of the route. It was also passed over by Lieutenant Mullan on his trip from the Muscle Shell, in 1853; but the northern pass was first discovered by Mr. Mullan when he passed over it with a wagon from Fort Benton, in March, 1854. There is another tributary of the Little Blackfoot flowing into it twenty-five miles below the point where Mr. Mullan struck it with his wagon, which may furnish a good pass to the plains of the Missouri. Its advantages and character were described to him by the Indians. Passing down the Hell-Gate river from the mouth of the Little Blackfoot, we come to several tributaries flowing from the south. Flint creek, one of them, is a large stream, up the valley of which there is a short route to the Bitter Root valley, in a direction west-southwest from its junction with the Hell Gate. This route is described by Major John Owen, Indian agent, and Mr. Adams, late Indian agent, as more rough than that down the Hell-Gate, but can be travelled in from six to twelve hours less time.

On these rivers are prairies as large as the Deer Lodge prairie, and the whole country between the Deer Lodge prairie due west to the Bitter Root valley consists much more of prairie than of forest land. The Hell-Gate river is thus seen to be 130 miles long, flowing for 60 miles through the broad and fertile Deer Lodge prairie, which is estimated to contain 800 square miles of arable land. Then, taking a direction more transverse to the mountain, opens its valley, continues from two to five miles wide, until its junction with the Big Blackfoot, at Hell-Gate,

after which it widens out to unite with the valley of the Bitter Root. On this part of it there are at least 150 square miles of fine arable land in the valley, and much grazing prairie on the adjoining hills. Around the Little Blackfoot most of the country is a hilly prairie, suitable for grazing, while in the immediate valley is sufficient arable land for the subsistence of a grazing population. The Big Blackfoot drains the semicircle from the Hell-Gate to somewhat north of the Gate of Sun river; the main stream flowing from the mountains at Cadotte's and Lewis and Clark's Pass, in latitude $47^{\circ} 12'$ and longitude $112^{\circ} 20'$. In the narrative a very minute description has been given of this valley and of its tributary streams; and it will be sufficient in this memoir to state that it furnishes undoubtedly at least four passes to the Missouri, two of which have been carefully examined in the course of the explorations. There is, properly speaking, on this river, as on the Hell-Gate river, no cañon; but the term cañon, which has been used, has reference to points where the wide and extensive prairies bordering the river narrow to a comparatively limited space, and is used to describe passes where there are no special difficulties, and where there is in all cases room enough for any kind of construction, looking to the movement of men and goods. The river itself has a general course a little south of west, winding considerably in some parts, but the length of its valley is about seventy-five miles, varying from half a mile to twelve miles in width. Neither this nor the Hell-Gate can be considered navigable above their junction. Its greatest rise and fall is six feet, as determined by careful observation of its water marks. On the 18th July, 1855, its water level was from 8 to 12 inches above low-water mark and 5 feet below high-water mark. These streams, together with the Bitter Root river, constitute a system of waters flowing from the semicircle, and after their junction, opposite Hell-Gate flow in a general course north, 45° west, to their junction with Clark's Fork at the Horse Plain, latitude $47^{\circ} 21'$, longitude $114^{\circ} 38'$. I have not deemed it necessary to speak especially of the western tributaries of the Bitter Root in this general connexion, as perhaps they have been sufficiently described in the particular description of the Bitter Root valley. Clark's Fork above its junction with this system of waters at Horse Plain assumes another name, and is known as the Flathead river. Indeed, Clark's Fork may be considered to be formed by the junction of the two systems of waters, the Bitter Root from the south and the Flathead from the north, which, in its turn, drains nearly as large an extent and as fine a country as the Bitter Root itself. These two systems of waters, the Flathead and the Bitter Root, are separated by a low mountain spur, which runs from about Steven's prairie, on the Big Blackfoot, to their junction, opposite Horse Plain. This spur is low, generally well timbered, well watered, and a large portion of the land arable.

Passing from the Hell-Gate to the Flathead river, we cross over this spur by a low divide going through the Coriacan defile, and coming upon the waters of Jocko river.

The height of this divide, above the Hell-gate, is 560 feet, and above the Flathead river, at the mouth of the Jocko, is 650 feet. From this divide a view of surpassing beauty, looking northward, is presented to the beholder. He sees before him an extraordinarily well grassed, well watered, and inviting country. On the east are the divides, clothed with pine, separating the Jocko and its tributaries from the streams running into the Big Blackfoot and into Flathead lake; and along the line of which two rivers Mr. Tinkham moved in September, 1853. To the north the Flathead lake, twenty-five miles long and six miles wide, is spread open before you, with extensive prairies beyond; and on the west, sloping back from the banks of

the Flathead river, a mingled prairie and forest country is seen. Here, in a compact body, is one of the most promising countries in this whole region, having at least two thousand square miles of arable land. Flathead river above the lake is formed by the waters of three streams, the northeast flowing from the pass pursued by Mr. Tinkham in October, 1853, and which, in the reports, has been named the Marias Pass. Its northwest branch, Maple river, has its rise in longitude $114^{\circ} 50'$ and in latitude $48^{\circ} 40'$, and connects by a low divide and through a timbered country with the Kootenay river, furnishing a route which was pursued by Lieutenant Mullan in his trip to the latter stream in April, 1854. The eastern branch, Swan river, joins it only three miles above the lake, and probably furnishes a route to the two Marias Passes, partially explored by Mr. Doty in 1854. Below the lake the Flathead river flows, following its windings some fifty miles to its junction with the Bitter Root, where the united streams assume the name of Clark's Fork. In this distance it is 100 to 200 yards wide, and so deep as to be fordable with difficulty at low water, its depth being three feet at the shallowest places. Its current is rapid and there is a fall of fifteen feet five miles below the lake. About eighteen miles below the lake it receives a considerable stream from the northwest, called Hot Spring creek, which was followed down by Lieutenant Mullan, on his return from the Kootenay, in May 1854, for thirty miles. In its valley, and around it, is also a large extent of fine land. Nearly opposite a small stream runs in from the east, and another from the same side ten miles below, by which there are routes to the upper part of Big Blackfoot valley. Three miles below the last it receives Jocko Fork from the south, and then turns abruptly in its course from south to northwest, receiving in the remaining nineteen miles to the Bitter Root only small streams, of which Kamas Prairie creek, from the north, is the principal. None of the branches of Clark's Fork above the junction can be considered navigable, but the river itself, (Flathead,) with the exception of the rapids and falls below the lake, which may be passed by a short canal, gives a navigation of at least seventy-five miles to the head of Flathead lake.

Clark's Fork empties into the Columbia about four-tenths of a mile north of the 49th parallel, as determined by a single observation made in 1853, but it cannot, however, be considered as accurately fixed. At its mouth is a fall of fifteen feet in height and a hundred and fifty yards in width. At a distance of a quarter of a mile from the main stream it passes through a deep gorge in the range, where it has a further fall of three feet. From this point to the Mission of St. Ignatius (seventy miles by the river) it has never been explored. About one hundred and thirty miles above its mouth is the Pend d'Oreille or Kalispelum lake, which is a beautiful sheet of water about forty-five miles in length, formed by a dilation of the river. The river is sluggish and wide for some twenty-six miles below the lake, where rapids occur during low water. Steamboats could ascend from this point to a point nine miles above the lake, or eighty miles in all. At high water they could ascend much further. Between the Cabinet (twenty-five miles above the lake) and a point seventy-five miles below the lake (a total distance of one hundred and forty miles) the only obstacle which occurs is where the river is divided by rocky islands, with a fall of six and a half feet on each side. The Hudson Bay Company's large freight boats are in the habit of ascending from the lower end of Pend d'Oreille lake to the Horse Plains, a distance of about one hundred and thirty-five miles, making only two portages. Above the Cabinet the river would be excellent for rafting purposes. Its greatest rise and fall is fifteen feet. The valley of Clark's Fork is generally wide, arable, and inviting settlement, though

much of it wooded. The prairies occupy but an inconsiderable portion of its valley and the surrounding country, yet there is no deficiency of grass, even for large trains, on this route, where care is taken in selecting camps. On the contrary, on this river are several very celebrated wintering places for Indian horses. Horse Plains derives its name from this circumstance. Thompson's Prairie and the country about the Pend d'Oreille lake are other instances. The Kootenay river enters into our Territory for a short distance, preserves a general parallelism to Clark's Fork, and flows into the Columbia some twenty miles north of the boundary. From its headwaters are at least two passes over the Rocky mountains, but there has been no exploration of the river, and it is not probably navigable for any considerable distance.

Having now described somewhat the rivers and the adjacent country of this mountain region, I will proceed to describe the passes which take you to the plains of the Missouri and to the plains of the Columbia. Big Hole Pass, as approached from the north or Bitter Root valley, has an excellent road for fifteen miles above the forks, where it becomes somewhat difficult for wagons for two or three miles across the spur called Ross Hole mountain. Above this is another broad, open prairie called Ross' Hole. This mountain can, however, easily be avoided by cutting away the trees which occupy the valley around its base. From Ross' Hole Lieutenant Mullan thinks that wagons can ascend, without much difficulty, the dividing ridge called Big Hole mountain to the waters of Wisdom river, to which the descent is perfectly easy, without any obstruction. The pass called Hell-Gate, sixty-five miles further east, crossed over by him on December 31, 1853, in returning north from Fort Hall, was found to offer no obstacle whatever to wagons, the ascent and descent being both easy and gradual. It leads into the large and beautiful Deer Lodge prairie, on Hell-Gate river. From Wisdom river, at their passes, down to its junction with the Jefferson is an excellent prairie route, which is believed, from Lewis and Clark's account, to extend down to the forks of the Missouri.

The southern Little Blackfoot was traversed by Mr. Tinkham in November, 1853, and by Lieutenant Mullan in March, 1854, when going from the Bitter Root valley to Fort Benton. It is considered by Lieutenant Mullan practicable for a wagon road, but less advantageous than the northern. Its elevation, as ascertained by Mr. Tinkham with the barometer, is 6,283 feet. The dividing ridge is but 300 to 500 feet high, and the eastern approach is practicable for a railroad with a grade of 50 to 60 feet per mile, the ridge being passed with a two mile tunnel, and the western descent with a grade of 30 feet. The broken character of the country between it and Fort Benton makes it, however, less fit for a main route than the passes further north, though it may be suitable for a direct route in the direction of Council Bluffs. It passes from Big Prickly Pear creek on the east to the south branch of the Little Blackfoot on the west. Its distance from the Hell-Gate Pass is about fifty miles, in a northeast direction. The northern Little Blackfoot Pass, six miles to the north of this, is the one crossed by Lieutenant Mullan with a wagon in March, 1854. It is described by him as perfectly easy, the descent being so gradual on the west side that his wagon was driven down with the mules trotting. The descent of the Little Blackfoot and Hell-Gate river is $22\frac{1}{2}$ feet per mile, and with a little cutting this can be made a better wagon route than any other. Cadotte's Pass, forty miles northeast of the last described, connects a tributary of Dearborn river on the east with a branch of the Big Blackfoot on the west. The approach from the east is up the narrow valley, bordered on each side by high wooded hills. The summit is a narrow, sharp ridge, about a mile and a half wide

from base to base, and partially covered with small trees. The western base is about 500 feet higher than the eastern, and the descent is very rapid, favoring the construction of a tunnel. Lewis and Clark's Pass is but a few miles north of Cadotte's, and connects more northern branches of Dearborn and Big Blackfoot rivers. Its elevation is 6,519.3 feet, and it also has a narrow ridge, only two and a quarter miles from base to base. The most northern pass, supposed by Mr. Tinkham to be the Marias, connects one of the principal sources of Marias river with a branch of Flathead river on the west. The approaches on each side are through deep mountain ravines, and a wall-like divide over 7,600 feet high separates the streams of opposite sides. A tunnel might be made at about the elevation of 5,450 feet, but as the branch of the Flathead falls 2,170 feet in seventeen miles, this route is not likely to be used. The pass last described is not, however, the true Marias Pass, for after leaving it and coming upon the chief tributary of the Marias, and moving southward eight miles, the true Marias Pass is plainly discernible. The true Marias Pass connects with the Badger tributary of the Marias, is wide, open, and easy, so far as it was examined by Mr. Doty in 1854, and as described by the Little Dog, the particulars of which are given in the narrative. It is probable that another pass, intermediate between the northern Little Blackfoot and Cadotte's Pass, will be found entirely practicable, and it should be examined. The passes which lead to the great plain of the Columbia are the southern Nez Percés trail, to which reference has already been made, leading from the upper waters of the Bitter Root; the northern Nez Percés trail, the route pursued by Lewis and Clark in their great explorations, and which was followed by Mr. Mullan on his return trip in 1854; the Cœur d'Aléne Pass, pursued by me in 1853; and Clark's Fork, pursued by Mr. Saxton and the main train in 1853. The following is a brief description of these passes: The southern Nez Percés trail goes up the southwest fork of the Bitter Root river, and crossing a dividing ridge, winds about over the summits of the high and rugged mountains separating the Kooskooskia from a more southern branch of Snake river, taking a very circuitous course to the junction of the main forks of the Kooskooskia. At the point where Mr. Tinkham's observations with the barometer ended, it had reached a summit over 7,600 feet above the sea, probably the same point where Lieutenant Macfeely found snow early in September. This is a mere Indian trail, which avoids the densely wooded valleys, and goes over the mountain summits, where the elevation prevents the growth of trees, and substitutes a growth of grass. Should it be found practicable to cut a road down the valley of the Kooskooskia, the divide between it and the Bitter Root is here still nearly 7,000 feet in altitude, making more northern lines preferable. The distance over mountains by this route was estimated by Mr. Tinkham to be one hundred and thirty-eight and a half miles. The northern Nez Percés trail is in character much the same, but its course is more direct. It passes up the valley of the Lo-Lo branch of the Bitter Root, (Traveller's Rest creek of Lewis and Clark,) and, crossing to a northern branch of the Kooskooskia, winds along the heads of branches flowing into this and the Pelouse (?) in a southerly direction, till it comes out on the Great Plain on the same place as the southern trail. The distance travelled across mountains by this route is about one hundred and twenty miles. The mountain dividing the waters which flow east and west is lower than some of those crossed in going up Lo-Lo creek, but covered with pine and fallen timber. This may be found a tolerable wagon route from valley to valley, if the timber which now obstructs them shall be found the only obstacle.

The Cœur d'Aléne pass, leading from St. Regis Borgia creek, (which empties into the Bitter Root river about half way between the Jocko cut-off and Horse Plain,) takes a westnorthwest

direction up that stream, and crossing a divide only 5,089.7 feet above the sea, continues in the same course down the Cœur d'Aléne river to the lake at the border of the Great Plain. In this pass the western ascent is the most rapid. The western base of the dividing ridge is of the same height as the eastern. The ridge will require a tunnel only $1\frac{3}{4}$ mile through. For a wagon road this is decidedly the best and most direct route, being almost in a line with the Hell-Gate valley, and requiring but a moderate amount of work to make it practicable, chiefly the cutting out of timber in the valley. The route down Clark's Fork crosses by the Jocko cut-off from Hell-Gate to the Flathead river, and crossing this, follows down its north bank in a northwest direction for $165\frac{1}{4}$ miles to the south end of Flathead lake. The only mountain ridge which could not be removed in making a railroad by this route is that between Hell-Gate and the Jocko, which is a rise of 560 feet, requiring a grade of fifty feet in ascending and sixty in descending to the north. This would probably be preferable to following down the Bitter Root to its junction with the Flathead, as that is reported by Mr. Lander to require many crossings, rock cutting, and embankments, below the mouth of the St. Regis Borgia.

Lieutenant Donelson estimates that ten men, in seventy-eight days' work of ten hours, would make this a good wagon road from Hell-Gate to the mouth of Pend d'Oreille lake. An examination of Lewis and Clark's narrative shows this curious incident: The Indians impressed them with the idea that the route which they pursued was altogether the most practicable of any route across these mountains, and yet it is unquestionably the worst route of the whole. They adopted the same policy in reference to these passes which they afterwards did in the Yakima country with the parties of the exploration. Indeed, so tenacious not only are the Indians, but even the missionaries, of their right of occupation, that it is impossible for them to resist the inclination to underrate the country and the routes, in order to keep white people out of it. Now, this route of Lewis and Clark is frequently taken by Indians at the present day, not because it is a good route, but because salmon and roots are found higher up the stream than on any other route, and it is a route, therefore, which furnishes them their food. They get high up the Koos-koos-kia on this route large stores of salmon, indispensable to their subsistence on their way to the plains of the Missouri. There are unquestionably other passes across the Bitter Root mountains which future exploration will develop. Reference in the narrative is made to a probable pass from the Pelouse, which has its rise in the main chain of the Bitter Root mountains to a few miles from the Bitter Root valley, and has a nearly straight course to the westward, through a wide, open, and heavily-wooded valley fifteen to twenty miles wide. This pass may connect with the Lo-Lo Fork. The St. Joseph's tributary of the Cœur d'Aléne river unquestionably furnishes another pass; and there are passes and known routes from points on Clark's Fork, just below Horse Plain, where you can pass into the Cœur d'Aléne country. From the divide of the Rocky mountains to the divide of the Bitter Root mountains there is an intermediate region, over one-third of which is a cultivatable area; and a large portion of it is a prairie country, instead of a wooded or mountain country. The following estimate gives in detail the areas of arable land, so far as existing information enables it to be computed: In the region watered by the Bitter Root river and its tributaries, not including Hell-Gate, the prairie region may be estimated at 3,000 square miles; in that watered by the Hell-Gate and its tributaries, including the whole country south and west to the Bitter Root, but not including the Big Blackfoot, there is a prairie region of 2,500 square miles; in that watered by the Big Blackfoot and its tributaries, the prairie region is 1,300 square miles. The country watered by the Flathead river, down to its junction with the Bitter

Root, and thence down Clark's Fork to the Cabinet, has a prairie region of 2,500 miles. The country watered by the Kootenay has 2,000 square miles of prairie. Thus we have, in round numbers, 11,200 square miles of prairie land. The whole area of the mountain region (divide of Rocky mountains to divide of Bitter Root, and from $45^{\circ} 30'$ to 49°) is about 30,000 square miles, and it will be a small estimate to put the arable land of the prairie and the forest at 12,000 square miles. Thus the country in the forks of the Flathead and the Bitter Root, stretching away east above the Blackfoot cañon, is mostly a table-land, well watered, and arable; and on all these tributaries—the Bitter Root, the Hell-Gate, the Big Blackfoot, the Jocko, the Maple river, the Hot Spring river, the Lo-Lo Fork itself—the timber land will be found unquestionably better than the prairie land. It will not be in the immediate bottom or valley of the river where farmers will find their best locations, but on the smaller tributaries some few miles above their junction with the main streams. The traveller passing up these rivers, and seeing a little tributary breaking out in the valley, will, in going up it, invariably come into an open and beautiful country. The observer who has passed through this country often; who has had with him intelligent men that have lived in it long; who understands intercourse with the Indians, and knows how to verify information which they give to him, will be astonished at the conclusions which he will reach in regard to the agricultural advantages of this country; and it will not be many years before the progress of settlements will establish its superiority as an agricultural region.

Between the Rocky mountains and the coast are the Cascade mountains, which, in the Territory of Washington, have nearly a north and south course. This range, in about parallel $47^{\circ} 15'$, is extremely narrow and low, but both northward and southward widens out, having a base on the Columbia river extending from Mount St. Helen's to Mount Adams, and on the forty-ninth parallel from Mount Baker to the sources of the western tributaries of the Okinakane. The region between the Cascade and the Bitter Root and Coeur d'Aléne mountains, just described, is remarkable for the great interior plain occupying nearly two-thirds of the country, and which has been denominated the Great Plain of the Columbia. This central portion of the Territory is watered by the main Columbia itself and its great southern branch, the Snake river. The Columbia, having its source in latitude 50° , pursues a northern course to latitude $52^{\circ} 10'$, when it receives the Canoe tributary, whose source is in latitude $53^{\circ} 30'$. It then turns immediately to the west and south, and continues on a course generally south until it comes below the boundary, then it flows through this great plain in a general direction nearly south; when arriving at Old Fort Walla-Walla it turns to the west and flows into the ocean in about latitude $46^{\circ} 15'$, longitude 124° . In its north and south course there are remarkable bends, one in about latitude $47^{\circ} 55'$, longitude $118^{\circ} 10'$; it turns nearly due west and it continues this course to the Okinakane, in longitude $120^{\circ} 05'$, a distance on the parallel of about eighty-five miles, but by the river at least one hundred and twenty miles. It then flows southwesterly for about fifty miles, and at the mouth of the Pisuouse, in latitude $47^{\circ} 22'$, again turns towards the southeast, which course it preserves as far as Walla-Walla, a distance by the river of one hundred and sixty-five miles, or one hundred and forty in a direct line. From the Columbia entrance up to the Cascades, a distance of one hundred and sixty-five miles, the river is without obstruction and can be navigated by large steamers. Sea-going steamers can ascend as far as Vancouver, one hundred and fifteen miles from its mouth. The Indians say that at the Cascades the river used to be perfectly free, but the gradual encroachments on its precipitous banks at length gave rise to a land slide, which, falling into the river, made a sort of

natural dam, which is evidently the case from the appearance of the shore. There is a portage around the Cascades of one mile and a half. The next obstruction is at the Dalles, two hundred and five miles from its mouth. At this place the Columbia makes a bend like a horseshoe towards the south and runs through a basaltic trough, with walls about twenty feet in height and two hundred yards apart; the current is very rapid, but is not rough. For canoes, a portage of eight hundred paces avoids this obstruction; for steamers, canalling a considerable longer distance would be required. In the absence of careful surveys, I have not the means of stating the distance along which improvements must be made to furnish continuous navigation, or in the absence of such improvements, the shortest land portage which would be required.

The portage now in use is from the Dalles to the mouth of the Des Chutes, a distance of eleven miles. But this distance can unquestionably be very much reduced. For the past two seasons the army supplies for the Walla-Walla post have been transported in sailing vessels from the mouth of the Des Chutes river to Old Fort Walla-Walla, and it is known that from that point to Priest's Rapids no obstructions exist. At Priest's Rapids canaling would probably be required, or a land portage of some three miles. The other obstructions are: Buckland's Rapids, sixty miles above Priest's Rapids; Ross' Rapids, near the mouth of the Methow river; and Kettle Falls. Ross' Rapids would not be an obstruction to steamers, but both at Buckland's Rapids and at Kettle Falls locks and canals would probably be required, more especially at the Kettle Falls, where the Columbia pitches over a ledge of rocks, making a fall of about fifteen feet perpendicular. In order to make the Columbia river continuously navigable from its mouth to Kettle Falls, a distance of 735 miles, locks and canals will be required at the Cascades and the Dalles, and probably at Priest's Rapids, and at Buckland's Rapids, giving the following reaches of navigable waters:

	Miles.
Entrance to Cascades	165
Cascades to Dalles	40
Dalles to Priest's Rapids	179
Priest's Rapids to Buckland's Rapids	66
Buckland's Rapids to Kettle Falls	274

Above Kettle Falls there is a navigable reach of some fifty miles, to a fall in the Columbia, a little north of the 49th parallel. It will be well to state that at high water steamers could probably ascend the whole distance from the Dalles to Kettle Falls, say from the middle of May to the middle of July. Steamers have been running regularly on the two first mentioned reaches for some years, and a steamer is now ready to run on the third reach, between the Dalles and Priest's Rapids. The business has increased quite rapidly; so much so, that for three years there have been from Portland and Vancouver two lines of steamers to the Dalles, and the rates of freights and passengers have become greatly reduced. The annual freshet of the Columbia is caused by the melting of the snow in the Alpine regions of the Rocky, Bitter Root, and Cascade mountains, and, as a consequence, takes place in the warm months of spring and early summer, commencing about the middle of April, and attaining its greatest height usually, and very regularly, by the 15th of June, at which time all the rapids from the Dalles to the Kettle Falls, near Colville, are, so to speak, submerged. Its great southern tributary, Snake river, has a general course in a semi-circle from its sources, in latitude 44° , longitude 112° ; running first south, and in latitude $42^{\circ} 30'$, curving around to the west, northwest, and finally north, to the mouth of the

Koos-koos-kia, in latitude $46^{\circ} 30'$. It then turns westward and joins the Columbia in about latitude $46^{\circ} 15'$, longitude $118^{\circ} 49'$, about forty-eight miles below Priest's Rapids. It is probably navigable for steamers at certain stages of the water as far as the mouth of the Pelouse, a distance of — miles, and probably to its junction with the Clearwater, or Koos-koos-kia.

Lewis and Clark took canoes on the Koos-koos-kia 59 miles above its mouth, and descended to the Snake, and thence to the Columbia, from the 7th to the 10th of October, 1805, the river being at its lowest stage. Their course on the Koos-koos-kia was 59 miles and on the Snake $139\frac{1}{2}$ miles. Comparing the difficulties they met with on the Snake with those they encountered on the Columbia, from the mouth of the Snake to the Dalles, they seem to be all of the same general character, leaving but little doubt of the navigability of the Snake for steamers to the mouth of the Koos-koos-kia or, perhaps, for even sixty miles further. The other streams which flow into the main Columbia from the east, worthy of being referred to in this connexion, are the Spokane, which has its confluence with the main Columbia at the point where it turns from the south to make the great bend to the west; Clark's Fork, and the Kootenay river, which has been already referred to in the description of the mountain region. The Snake river itself has considerable tributaries; first, the Pelouse, which consists of several branches, one coming from the north, having its rise in the central portion of the Great Plain of the Columbia; but the main branch comes from the main divide of the Bitter Root mountains, flows nearly due west for 130 miles, and joins the other branch of the Pelouse twelve miles above its mouth. In the narrative a circumstantial account is given of the great fall of the Pelouse, which is an extraordinary place for salmon, and therefore a great resort for the Indians. The most considerable tributary of Snake river, however, is the Clearwater or Koos-koos-kia river, which flows into the Snake at a point where, running nearly due north, it turns suddenly to the west. This Koos-koos-kia has several branches which, with the main stream, flow through a country densely wooded with fir and larch, spruce and cedar. These tributaries of the Koos-koos-kia coming from the north are not navigable, but are excellent for rafting; and the pineries and forest trees on their banks will furnish an inexhaustible supply for settlements in the lower portion of the Clearwater and Snake River valleys, now destitute of wood. The Salmon river flows into the Snake fifty miles above the mouth of the Clearwater, and it also passes through a very rich and arable country. At the crossing of Salmon river, a landmark well known to Indians and voyageurs, the Mormons had last year a flourishing settlement. The Snake river forms a great re-entering from the Clearwater to its junction with the Columbia, which re-entering, being bounded on the south by the Blue mountains, has been named the Walla-Walla valley, although that term properly applies to the immediate system of valleys whose streams connect with the Walla-Walla river itself. That portion of the Great Plain lying east of the main Columbia, and which may be regarded as bounded on the north by the Spokane, and on the east by the foot-hills of the Bitter Root mountains, is, for the most part, well watered and well grassed. The eastern half of this portion is exceedingly well adapted to agricultural purposes. The various streams—the Pelouse, the Kamas Prairie creek of the Cœur d'Aléne, the Spokane and Cœur d'Aléne rivers—are well timbered with pine, and numerous rivulets and springs are found through that portion of the country, facilitating the progress of settlements, and rendering the whole at once available to the agriculturist. Indeed, the whole of the western slopes of the Bitter Root mountains are densely timbered with pine, spruce, larch, cedar, and other trees. These spurs have, in most cases, a gradual slope to the west, and the valleys of the several streams above referred to, as well as the Clearwater and Clark's Fork,

are wide and open, including in the lower valley the immediate, gentle, and numerous lateral spurs branching off from the main spurs.

The central portion of the district under review is remarkable for its great number of lakes, which are favorite places of resort for wild fowl. On these lakes are seen swans, geese, and ducks in large numbers. The western portion of this country, however, commencing a little north of the mouth of Snake river, and terminating some distance south of the mouth of the Spokane, is rather sparsely grassed and scantily supplied with water for farming purposes. Looking on the map, it will be observed that the course of the river almost makes a peninsular of this poorest portion of the Great Plain east of the main Columbia itself. It is a basaltic formation; and it would seem that the walls of basalt occurring from point to point had dashed the river up against the immediate spurs of the Cascades, crowding it into a sinuous and somewhat difficult course. Here is the great coulée which, in the narrative, is referred to by Lieutenant Arnold, and which has been supposed to have been the former bed of the river. This coulée, which, starting from the Columbia sixty miles below the mouth of the Spokane, and moving in a general direction south-southwest, does not extend across the peninsular to the Columbia again, but, after proceeding twenty-five miles, passes into the general surface of the plain and disappears. Yet in this portion of the Great Plain, and especially on the bank of the main Columbia, are many tracts and swales of good land. Indeed, there will be always found in this portion farming land enough to make practicable the occupation of the whole country by stock raisers and wool growers. The stock raiser will always be able to find land enough for the supplies he requires for his family. It is somewhat remarkable that leaving either the main Columbia below Fort Walla-Walla, or the Snake river, or the Clearwater, and passing over the high bluffs which border these rivers on the northern side, you at once enter upon a rich table-land. At the Red Wolf's ground these bluffs are more than one thousand feet above the immediate river valley, and in the neighborhood of the mouth of the Pelouse eight hundred feet. Thence they decline somewhat gradually to the mouth of Snake river, where the country, for many miles about, is not over fifty feet above the waters of the Columbia; north of the Columbia the bluffs are also several hundred feet high. This country is exceedingly well known to the old residents of the interior, who travel it in various directions, there being many trails crossing the Snake river and leading to Colville and the Bitter Root valley. From Lapwai, the Red Wolf's ground, a point intermediate between the Red Wolf's ground and the mouth of the Tukanos and the mouth of the Pelouse, trails pass on to the interior, all proceeding from a common point in the Walla-Walla valley. This country is better supplied with wood than has been generally imagined. If the voyageur travelling over this country, whatever route he takes, be asked what sort of country it is, he will tell you an excellent country for travelling—wood, water, and grass everywhere. But the pine of the Spokane extends nearly to its mouth, and for some miles south of the river. The Spokane is the name of the main stream to its junction with the Cœur d'Aléne river, when its name is given to a smaller tributary coming from the north, the Cœur d'Aléne being the main stream. One of the most beautiful features of the Cœur d'Aléne river and country is the Cœur d'Aléne lake, which is embosomed in the midst of gently sloping hills, covered with a dense forest growth; the irregularity of its form, and the changing aspect of the scenery about it, makes it one of the most picturesque objects in the interior. The Cœur d'Aléne river itself has tributaries flowing from near the main divide of

the Bitter Root, the most considerable of which is the St. Joseph's river, which has a general parallel direction with the main Cœur d'Aléne, and is about twenty miles south of it.

The whole valley of the Cœur d'Aléne and Spokane is well adapted to settlement, abounding in timber for buildings and for fires, exceedingly well watered, and the greater portion of the land arable. Even on the main route from Colville to the mouth of the Pelouse there is much arable land for thirty miles south of the Spokane; and although in the central portion of this route trap and basaltic formations occur from time to time, yet the grazing is excellent, and the country but gently rolling. East of this line the whole country may be denominated a cultivatable country. Through this portion of the Great Plain considerable ridges run from the northeast to the southwest, and the whole country has a general inclination both to the Snake river and to the Columbia. Thus on the trail from the Red Wolf's ground to the Cœur d'Aléne lake the summits have elevations of 3,338.7, 4,057.1, 3,701.1 feet, respectively, and the river valleys of 1,206.3, 2,702.8, 2,906.2, 2,795.8 feet, while on the trail from Colville to the mouth of the Pelouse the highest summit level is 2,540 feet, and the country thence declines to 592.9 at the mouth of the Pelouse. On the line of the Grand Coulee the highest summit level, from the point where it leaves the Columbia, is 1,642 feet, and the country thence descends to 335 at the mouth of the Snake. North of the Great Plain, that is from the Spokane to the 49th parallel east of the main Columbia, the country for the most part is densely wooded, although many valleys and open places occur, some of them now occupied by settlers, and all presenting advantages for settlement. Down Clark's Fork itself there are open patches of land of considerable size, and so on the Kootenay river. North of the Spokane is a large prairie, known as the Cœur d'Aléne prairie, through which the trail passes from Walla-Walla to Lake Pend d'Oreille. This prairie contains some six hundred square miles. Between this prairie and the main Columbia is a mountain spur which deflects Clark's river to the north, and which may be called the dividing ridge between the lower portion of Clark's Fork and the main Columbia, and between Clark's Fork and the Spokane; between which, however, and the main Columbia are two valleys, the Colville and the Chimikaine valley, connected by a low divide, a favorite route, through which passes the most generally travelled trail from Colville to the country below. Here is a line of settlements on the main Columbia itself. From Fort Colville to where it bends suddenly to the west there is a good deal of excellent land. It will be safe to pronounce the whole country north of the Spokane and lying between the main Columbia and the Kootenay and the Cœur d'Aléne mountains as a cultivatable country, although the dense forests will be an obstacle in the way of the rapid occupation of the country. But here comes in another element of wealth: the country about Colville and on Clark's Fork has been pretty thoroughly prospected for gold, and it exists in paying quantities throughout that region. On the Kootenay river are found mines of lead, copper, quicksilver, sulphur, and platinum; and there can be no question, from information derived from practical miners, from geological explorers, and especially from the testimony of the Jesuit fathers, De Sme, Hurkan, and Ravili, that this is a very rich country in minerals. Perhaps the country east of the main Columbia has been described with sufficient minuteness, and nothing more need be said than to refer to its boundary on the south, the Blue mountains. These mountains, having a general east and west direction but a few miles south of the 46th parallel, have a course to the north to the eastern portion of the Walla-Walla, re-entering and send streams to the Walla-Walla and the Snake. These streams have pine on the upper portions, of good size and in large quantities, and will enable settlers to procure lumber for their buildings at a moderate

expense. Among the various tributaries of the Walla-Walla are Mill creek, Dry Fork, and the Touchet; and of the Snake river, the Tukanon and the Alpahwah.

The narrative of this exploration will render it unnecessary to go into minute details descriptive of these several streams, the object of this memoir being to present the general features, and deportment, and spirit of the country. It should, however, be mentioned, in connexion with the lake system of this great plain, that in the wooded region north of the Spokane are some remarkably picturesque lakes, as Lake Pend d'Oreille, on Clark's Fork, and Lake Rootham, some thirty miles northward of Clark's Fork, both of which are graphically described in the Oregon Missions of De Sme.

Coming now to the country lying between the main Columbia and the Cascade mountains, it may be necessary to describe, with some little particularity, the various streams and their several tributaries flowing into the main Columbia. A glance at the map shows that the general course of these streams is very much to the south, and between them are generally to be found high mountain spurs which run to the Columbia itself, overhanging it many hundred feet. The most considerable rivers are the Yakima, with its Pisko, its Atahnam, its Nachess, its Wenass, and other tributaries. The Pisko or Wenatchapam river, Lake Chelan and the Chelan river, the Methow river and the Okinakane river, which may be described as follows: The Yakima rises in the vicinity of the passes of the Cascade range, latitude $47^{\circ} 15'$, from several large and beautiful lakes, and, taking a general course to the southeast, runs for 160 miles to its confluence with the Columbia, in latitude $48^{\circ} 05'$. For twenty-five miles down the stream its valley is only from half a mile to a mile wide; it then widens out in Ketetas plain, which is ten or fifteen miles wide, the river there being ninety feet wide and about three in depth, but very rapid. Below this plain the river curves gradually to the south until it receives the waters of the Pisko, then turns again eastward to its mouth. Between the Ketetas and Atahnam, for thirty miles, the hills again encroach on the valley, but below that it again widens out to six or ten miles, with numerous branchings among the hills. On the west side, opposite Ketetas plain, three streams, the Pteh-num, Emptenum, and Wenass, rise among the hills separating the main Yakima from its principal branch, the Nachess. These streams are from 15 to 20 miles long, and run through small and fertile valleys. The Nachess rises in the vicinity of the Nachess Pass, and, running nearly parallel to the Yakima at a distance of fifteen or twenty miles, joins it after flowing about fifty miles. It has a valley from half a mile to four miles in width. The Atahnam rises about thirty miles south of it, and runs in a more easterly course, emptying about ten miles below; its valley is smaller than that of the Nachess, but fertile. The Pisko rises among the hills east of Mount Adams, and in size and character resembles the Atahnam. Only two small branches join the Yakima from the north and east, one running through the middle of Ketetas plain from the hills northward, the other running almost directly contrary to the upper Yakima from the hills east of its southerly bend. The Pisquouse and Entealkuese, which enter the Columbia near latitude $47^{\circ} 30'$, are, at their mouths, rapid streams, with high falls as they descend from the hills at the foot of the Cascade range into the deep valley of the Columbia. They are supposed to head in the mountains about thirty miles northwest of it. The Chelan rises in a lake which is reported by the Indians to run for thirty miles back among the mountains, and approaches to within two miles of the Columbia, into which its outlet falls, by a series of cascades, 350 feet in this short distance, in about latitude $47^{\circ} 45'$.

The Methow rises by several sources in the mountains northwest of Fort Okinakane, and running southeasterly, empties near latitude 48° . On its upper part there is a fine wide valley,

but this narrows to a mile for ten miles above its mouth. The Okinakane rising in a long series of lakes north of the 49th parallel, runs nearly south for seventy miles within the Territory, joining the Columbia only eight miles above the Methow. It expands into several small marshy lakes in its course, and is generally slow and deep, but in one place, thirty-three miles above its mouth, there is a fall of five feet. Its valley is fine, and the hills around well grassed, wooded, and arable. It receives a branch from the northwest near the falls, which runs through a rough, hilly country, and has some high falls near its mouth. The Ne-hor-al-pit-kwa is a stream which enters the Columbia opposite Fort Colville. It has a winding course of about seventy miles, and has numerous beautiful prairies in its valley, though the hills around, partially wooded, are also to a great extent arable. None of these rivers west of the Columbia are navigable except, perhaps, the Yakima, for part of its course at high water. Lake Chelan is doubtless navigable for many miles, but is cut off from the Columbia by the fall of its outlet. Between these rivers are spurs thrown out from the main chain of the Cascades, and extending towards and in some cases reaching the banks of the Columbia. Those between the Klikatat and Pisko tributary of the Yakima, and between the main Yakima and the Wenatshapam, or Pisuouse river, are considerable mountains; thus on the trail pursued by Lieutenant McClellan the rise from the Klikatat valley to the divide is 2,364 feet, and the descent to the Pisko 2,114 feet, the elevation of the divide being 3,633 feet above the sea. The rise from the main Yakima to the divide separating it from the Wenatshapam is 4,048 feet, and the descent to the latter stream 4,264 feet; the summit level is 5,750 feet. Here the spur comes upon the river, making the trail difficult. The country north of the great western bend of the Columbia from the mouth of the Spokane to the mouth of the Okinakane is much more gentle and less elevated.

Great injustice has been done this country by a want of patience and consideration on the part of gentlemen who have gone over it rapidly in the summer, and who have been over it but once; it is impossible to speak understandingly of a country unless one has had experience and opportunities of observation in countries somewhat similar. Now, the most intelligent voyageurs and best practical farmers in that country agree in opinion that there is a large quantity of arable land throughout this country, and very superior grazing. This is the opinion of intelligent Indian chiefs who have themselves made some progress in raising crops, and who are already great stock raisers. South of the Yakima is a low divide separating its waters from the waters flowing into the main Columbia in that portion of the river where, after leaving Fort Walla-Walla, it proceeds westward. This divide has a general parallel course to the Columbia, is nearly east and west some thirty miles from the main river, and between it and the Columbia is a large body of arable land, nearly every acre of it adapted to cereals. This country has not come under the observation of a scientific party with instruments in hand, but has been much travelled over by intelligent officers of the Indian service, and by the practical agriculturists of the country. Little streams flowing from the southern side of this divide, which is well wooded all through, pass down to the main Columbia, watering the country and furnishing the means of supplying the farm and animals with water.

On the several tributaries of the Yakima, particularly towards their upper waters, the land is rich and adapted to most of the crops, and so in the valley of the main Yakima itself. This valley has been denominated by some a desert and sage plain; sage does not occur in spots and small quantities, but much of the country is cultivable and productive. It may be observed that in regard to the whole of this central portion of the Territory it will be necessary to exercise care as to seed-time, and farmers will have a disadvantage over those west of the

Cascades in their seed-time being very much shorter; but with ordinary care as to the time of putting in seed no danger need be apprehended from droughts. This portion of the country is wooded about half way from the divide of the Cascade mountains to the Columbia itself, but you pass up the main Yakima seventy miles before you reach the building pine, although cotton-wood is found on its banks sufficient for camping purposes; but when you reach the Pisko, or Wenatshapam, you come to a wooded region which extends to the main Columbia. The forest growth of the upper waters of the Clearwater and of the main Columbia, from above the mouth of the Wenatshapam, furnishes inexhaustible supplies, which, after being rafted down the streams—that is, the Snake and Columbia rivers—will furnish settlements in the vicinity of those rivers with firewood and lumber at moderate rates. So great are the facilities for rafting that it almost amounts to a continuous forest along these streams. The Blue mountains, which were referred to as bordering the Walla-Walla valley on the south, have a general course westward, south of the main Columbia, until they unite with the Cascade mountains, from which flow many streams to the Columbia, the Umatilla, Willow creek, Butter creek, John Day's river, and the Des Chutes river. On the immediate banks of the Columbia the country is not promising; but going back a little distance the grazing is very luxuriant and excellent and the soil rich, particularly in the river valleys. The traveller, starting from the Des Chutes river and simply passing southward a mile or two from the trail, will be struck with the freshness and luxuriance of the grass in August, September, and October, and with the arable qualities of the soil. This is especially true of the country up John Day's river; its principal tributary coming from the North Rook creek, or Butter creek, Willow creek, and the Umatilla. When this interior becomes settled there will be a chain of agricultural settlements all the way from the Walla-Walla to the Dalles, south of the Columbia, along the streams just mentioned, and north of the Columbia on the beautiful table-land which has been described to border it from the Walla-Walla westward. The Dalles is a narrow place in the Columbia river, where the channel has been worn out of the rocks, below which, about ten miles, is the mouth of the Klikatat river, whose general valley furnishes the route of communication with the main Yakima and the several intermediate streams, the trails pursuing a generally northerly direction. In this Klikatat valley is much good farming land.

It is also worthy of observation that gold was found to exist, in the explorations of 1853, throughout the whole region between the Cascades and the main Columbia to north of the boundary, and paying localities have since been found at several points, particularly on the southern tributary of the Wenatshapam. The gold quartz also is found on the Nachess river. The gold bearing, crossing the Columbia and stretching eastward along Clark's Fork and the Kootenay river, unquestionably extends to the Rocky mountains.

The Cascade mountains in Washington Territory are 130 miles, as an average, from the coast. The waters of Puget Sound, Admiralty Inlet, Hood's Canal, and the several channels connecting them with the Georgian bay—the whole system being popularly known as Puget Sound—lie between the Cascades and the coast. The Straits de Fuca, through which they pass to the ocean, extend eastward nearly a hundred miles, from which point the waters referred to run nearly due south as many miles more. The peninsula thus formed, lying between Puget Sound and the coast, is partly a rolling and partly a mountainous country. The Coast range reaches a considerable altitude half the distance to the Straits de Fuca from opposite the head of the sound. The country generally, however, west of the Cascade mountains, is heavily timbered, and the prairie land is perhaps not one-third of the whole. Starting with the

western coast, the principal points of interest are Shoalwater bay, an extensive body of water into which flow a number of considerable streams, and where abound shell fish of all kinds, and especially oysters, for the San Francisco market; Gray's harbor, into which flows the Chehalis river, whose valley is the most extensive and richest of the river valleys west of the Cascade mountains. The Chehalis has its source near to the Columbia river, runs nearly due north for thirty-five miles, and then taking a general direction north of west for forty miles flows into Gray's harbor. It receives many tributaries; from the east, Newawcum and the Skookum-Chuck; and from the north, the Black river, the Satsop, the Wanoochee, and other streams. On these last named rivers are extensive praries and rich bottom lands. The whole country from the Chehalis to the head of the sound and the head of Hood's Canal is remarkably well adapted to farming purposes. South of the Chehalis and separated from it by a narrow mountain spur is the Willopah river, having a course nearly parallel to that of the Chehalis, and which flows into Shoalwater bay. It has a rich river valley, which, though smaller than the valley of the Chehalis, is equally inviting. Those who have passed over the trail in the Willopah valley to the Cowlitz river speak of the wooded country as being arable and adapted to farming. Around both Shoalwater bay and Gray's harbor there are extensive meadows and natural prairies, and the grass is green throughout the year. Perhaps in no month is the grass better adapted for fattening cattle than the months of February and March. North of Gray's harbor, in which also flow quite a number of streams, making the whole country about it full of resource and full of inducement for settlement, are several other streams; the Quinaitl river, which flows from a lake of the same name, where a particular kind of salmon abound, of a small size, and which is a favorite resort for Indians. Without going into further details of the country on the coast, it may be observed that the timber lands, which cover nearly the whole surface of the country west of the Coast range, are arable and rich. The Indian agents who have traversed the country have given very special attention to this question, and have made official reports in regard to it.

Coming now to the Columbia river, there are several streams flowing into it from the north—Gray's river, the Cowlitz river, the Cathlapoot'l, the Washougal, and the White Salmon, the latter being east of the Cascade mountains. The Cowlitz is worthy of mention because it furnishes a route used in passing from the river to Puget Sound, navigable for thirty miles for canoes to the Cowlitz Landing, with water enough for boats some miles further up to the Cowlitz farms. It is rather a remarkable river in that country; its bottom lands are exceedingly productive and the soil literally inexhaustible. It has several branches, all flowing from Mount Saint Adams.

The Cathlapoot'l also flows from Mount Adams and the spur of the Cascades lying between it and Mount Saint Helen's, having near its mouth much excellent land. This river, however, cannot be said to be a navigable stream for canoes, with the exception of its lower portion for a few miles. It will not be necessary to elaborate any further the rivers flowing into the Columbia, and we will now return to the rivers flowing into the sound. These are the Des Chutes river, flowing into Budd's inlet, on which Olympia is situated; the Nisqually river, flowing into the sound at Nisqually; the Puyallup river, the D'Whamish, the Snohomish, the Skagit, the Lummi, the Neuksack, and other streams, all flowing in from the east. Of all these rivers the largest and one of the most important is the Skagit. The Skagit has its rise in British territory, flows east of Mount Baker in a generally south course, and reaches the waters of the sound in about latitude $48^{\circ} 20'$, longitude $122^{\circ} 25'$, about fifty miles south of the

49th parallel. This river is navigable nearly up to the 49th parallel, with the exception of a small distance near its mouth, obstructed by rafts, and on its banks is an arable and productive country. The mouth of the Skagit and the vicinity adjacent is also very productive, and the land will not be difficult to clear, for the growth is small, being a sort of underbrush. The Snohomish river has several tributaries, the Steilaquamish, the Snoqualme, and other streams. Here is also a most excellent country, and unusual proportion of prairie land. The Snoqualme Falls, fifty miles from the sound, are a great curiosity. The fall is about two hundred feet, and there is quite a body of water. Just above the falls is a celebrated prairie, known as Ranger's prairie, where was a block-house for volunteers in the Indian war of 1855 and 1856. The Steilaquamish river also flows through prairies well adapted to cultivation, and the timber land on its banks, as elsewhere through the territory, is good. The D'Whamish river has several tributaries, Black river, which flows from the D'Whamish lake, east of Seattle, Cedar creek, flowing into Black river from the east, Green river, and White river. White river has its source in one of the passes of the Cascades, the Nachess pass, and Cedar creek in another pass of the Cascades, called the Snoqualme Pass; and the Snoqualme itself also has its rise in this pass. These are the two principal passes of the Cascade mountains, the Nahchess and the Snoqualme. The Nahchess is, in round numbers, 5,000 feet above the sea, and the Snoqualme 3,500 feet. A peculiarity of the Snoqualme Pass is that the approach from the east, up the valley of the main Yakima, leads by several lakes, and finally by Lake Kitchelus, where there are two trails for crossing the pass—one trail, practicable for horses, passes over the divide south of Lake Kitchelus, and falls upon the waters of Cedar creek; the other trail passes north of Lake Kitchelus, passes over a lower divide, and falls upon the upper waters of the Snoqualme river. This second trail is somewhat encumbered by fallen timber, and is therefore difficult for animals; yet, in 1856, it was passed over by the volunteers with animals, and a scout made by them into the Yakima valley from Ranger's prairie. This is unquestionably the best pass of the Cascades north of the Columbia river, but it is probable that there are other practicable passes to the north; and practicable passes are known to exist south of the Nachess pass. The Nachess pass is approached from the east by the valley of the Nachess river, and, as before observed, connects with White river. While this pass is entirely practicable for pack-animals during the summer months, and has enabled emigrants to come into the Territory with their teams, it is, nevertheless, not so favorable as the Snoqualme Pass. The approach up the Yakima is much more easy and gentle than up the Nahchess, and, whatever be the difficulties from the Snoqualme, from the western slope to the sound, they are a good deal more from the Nachess to the sound. Still the country is difficult from both passes, being heavily wooded, and there being many streams, and much work is required in bridging streams and in cutting out timber to make easy roads.

The labors of the boundary survey will develop a very interesting section of country, and may make known passes near the parallel; but it is probable that the Snoqualme Pass will be found to be at least fifteen hundred feet lower than any other pass, either north or south. The line of the 49th parallel crosses the Cascades at an elevation of at least five thousand feet. It then descends into the valley of the Skagit river; and it will be a question as to whether the point referred to is not on a spur, and whether the main range beyond the Skagit will not be found to be considerably higher in altitude. It will not be necessary to give a more particular description of the other rivers flowing into the sound from the east. They are all of the same general character. In the spring the melting of the snows of the mountains causes them to be

high, and the rains of the fall and winter cause them at times to be perfect torrents. They may be called ugly streams, all of them, and are a great obstruction to travelling in the country. They are all uniform, too, in the character of their valleys. This obtains with the Chehalis and Willopah and the Cowlitz, equally with the rivers of the sound. Their bottom growth is vine maple and curled maple, alder and cedar. There are some small streams flowing into the sound from the west, which it is not necessary particularly to advert to in this connexion; but a considerable stream flows into Hood's Canal near its head—the Skokomish river. There is a large quantity of tide prairie near the mouth of this stream, and it has been selected as an Indian reserve, for it abounds in the food of which the Indians are fond. The Skokomish has its rise well to the north on the eastern slopes of the Coast range. It may be observed that the many inlets at the head of the sound furnish an inexhaustible supply of logs for the mills and spars, and piles for shipping. The scenery of a summer's day on one of these inlets is lovely beyond description. It is constantly changing; the high forest trees under the soft gentle skies of summer mellow and transform the whole landscape; and the traveller passing from point to point is charmed by the endless succession of beautiful and ravishing scenes. There are on the sound many islands worthy of mention, the most important of which is Whidby's island; that may be called the garden of the Territory. On this island is a considerable quantity of prairie land, which at an early day was taken up by the settlers. In the woods on its southern and northern extremities is found the white deer. They are taken in great numbers by the Indians, and their venison is a favorite and much used article of food. North of Whidby's island are islands still more important, which are now in dispute between the two countries. By the treaty of 1846 it is provided that the boundary line should run on the 49th parallel to the centre of the channel between Vancouver's island and the main; and then going southward it should continue on the main channel, separating from the main the Straits de Fuca and the Pacific ocean. The British government claim that the true channel is the Rosario channel, which hugs the main land; the American government claim that it is the Channel de Haro, which hugs Vancouver's island. The islands intermediate, valuable for their rich arable lands, for their unsurpassed pasturage, and more especially valuable for their admirable harbors—key points in time of war, and therefore important in a military point of view—are now in dispute between the two countries. They are referred to in this connexion as important points in the geography of this country.

HYDROGRAPHY OF THE COASTS AND NAVIGABLE WATERS OF WASHINGTON TERRITORY, PREPARED BY
DR. J. G. KOHL, U. S. COAST SURVEY.

In the year 1853 that portion of the northwest territory of the United States bounded by the Columbia river on the south, the Pacific ocean on the west, the Straits of Juan de Fuca and the 49th parallel on the north, and the Rocky mountains on the east, was organized as a separate territory under the name of Washington Territory, and its limits defined and established.

The west region, now comprised under the name of Oregon and Washington Territories, was formerly known under the several names of California, New Albion, Canada, and Missouri Territory. It was designated by Vancouver "New Georgia."—(See Vancouver, volume 1, page 289.) He says what he intended to call "New Georgia" should extend as far south as latitude 45°, and northward to the Gulf of Georgia. North of the mouth of the Columbia river the sea-coast changes its outlines and configuration as well as its general direction, and presents a different aspect from that south of the Columbia. It recedes gradually to the northward for about 130 nautical miles, assuming finally, near Cape Flattery, a northwest direction.

Cape Flattery is the most westwardly point of American territory, and the general coast-line is here broken by the broad Strait of Juan de Fuca, which enters the continent in an eastwardly direction.

This section of the northwest coast between the Columbia river and the Straits of Juan de Fuca may be subdivided as regards general features at Point Grenville. South of this point the coast is sandy and low and marked by shallow bays or lagoons. North of Point Grenville the coast is more elevated and rocky, and tends more gradually to the westward. These changes in the margin of the coast are the consequences of corresponding changes in the interior of the country.

The southern coast ranges of mountains terminate south of the Columbia river; then comes a broad, low country, through which the Columbia enters the sea, and in which are found Shoalwater bay, Gray's harbor, &c., and to the northward rises again a group of mountains of small extent comparatively, and of which Mount Olympus is the most elevated peak, and which may be called the Mount Olympus range. This range is isolated, and forms the culminating ridge of the peninsula between Puget Sound and the sea.

This peninsula is bounded on the west by the Pacific, on the north by De Fuca strait, and on the east by the long and numerous branches of Admiralty Inlet. On the south it is connected with the continent only by a narrow isthmus between the southern end of Puget Sound and Gray's harbor or Shoalwater bay. The breadth of this isthmus is about thirty-five miles, while the whole peninsula has a circumference of nearly three hundred miles.

If Puget Sound and the lagoons of the Columbia river delta were joined, the Mount Olympus peninsula would be a perfect island; perhaps this was once the case.

MOUNT OLYMPUS, $47^{\circ} 47'$ NORTH LATITUDE, AND $123^{\circ} 22'$ WEST LONGITUDE.

Mount Olympus is the most conspicuous point of the whole peninsula. It is a high peak of little more than 8,000 feet altitude, and is surrounded at its base by other lofty mountains. Its summit is covered with perpetual snow.

The mountains around its base descend gradually to hills of a moderate height, and terminate on the coast of the Pacific in low cliffs, which fall perpendicularly on a sandy beach. Mount Olympus is an isolated and conspicuous peak, which can be seen from far out on the ocean, and must have been to navigators a prominent landmark, being the first point visible to the eye of the navigator approaching land.

The Spanish pilot, Juan Perez, was its first discoverer. He called it "El cero de la Santa Rosalia," (the peak of Santa Rosalia.) It was afterwards called by the Spaniards La Sierra de Santa Rosalia, (the Santa Rosalia range.) This name was not, however, introduced in geography, because the Spaniards made nothing known about their early northwestern explorations.

Captain Berkely, the discoverer, may also have seen this mountain, (1787,) but we are imperfectly acquainted with his discoveries, and know not what name he may have given to it.

Captain Meares saw the mountain again on the 4th of July, 1788, and gave it the name "Mount Olympus," or as he sometimes writes "Olympius," and because he published and made known his discoveries and names, this name was adopted by Vancouver, (1792,) and still remains on our charts.

This mountain range has never been thoroughly explored. The altitude of Mount Olympus, 8,138 feet, is that given by Wilkes in 1841.

SHOALWATER BAY, 46° 18' NORTH LATITUDE, AND 124° WEST LONGITUDE.

From Cape Hancock, which is a precipitous headland forming the northern cape of the mouth of the Columbia, the coast becomes at once again low and sandy, and forms a long, broad, even beach, which runs for twenty miles directly north. This beach, called the Weather beach by the inhabitants of the Territory, is probably one of the most remarkable in the world. It is about one hundred yards wide at low water, perfectly even and hard, and the huge waves of the Pacific break upon it in parallel lines for many miles, presenting a sublime spectacle.

The beach has a range of low sandy and wooded hills behind it, which with the beach form a long peninsula, separating the southern part of Shoalwater bay from the ocean.

SHOALWATER BAY is a large basin of more than one hundred square miles in extent.

The entrance to this basin is a little more than five miles wide, between two low spits of land.

Cape Shoalwater or "Toke point" on the north and Lead-better point on the south.

The entrance is filled with shoals and bars, like the bay itself. But two good channels, more than one-half mile wide, lead into it, one on the north and one on the south; between them are the so called "middle sands."

Both these channels have three fathoms on the bar at low water, and they are easily found and quite accessible.

The interior of the basin may be divided into two parts, a northern and a southern part. The northern part presents its greatest extents from east to west, and the southern part runs for nearly twenty miles to the south and parallel to the shore. The whole is filled with innumerable shoals, banks, mud flats, and low spits of land, which, like small peninsulas, run out from the land.

The shoals are nearly all bare at low water. Between them and the said peninsulas extends a net of many navigable channels, but vessels can approach the shore in only few places.

Quite a number of small rivers and creeks empty into the bay, of which the principal are the *Nasal*, the *Copaluks*, and the *Willopah*.

The tide, the extremes of which are about the same as in the Columbia river at Astoria, extends from eight to fifteen miles up these rivers, but they can hardly be considered thus far navigable for small vessels.

The bay is visited principally by coasting vessels engaged in collecting oysters for the San Francisco market. The country around the bay is, like most of the interior of the Mount Olympus peninsula, heavily wooded with hemlock, fir, spruce, and arbor vitæ.

There seems to be a strong probability that Shoalwater bay once formed a part of the estuary of the Columbia river, the rocky promontory of Cape Disappointment being then an island; very narrow and low isthmuses separate the waters of Columbia river from Shoalwater bay, and the Indians have several portages over which they transport their canoes in passing to and fro.

This interesting bay was for the first time discovered and named by Captain Meares, on the 5th of July, 1788. He did not enter it, but looked into it and recognized its principal characteristics from the masthead. He states that the bay extended a considerable way inland, spreading into several arms or branches to the northward and eastward, and that the back of the bay was bounded by high mountains.*

Vancouver did not explore this bay, though he ordered an exploration of the neighboring bays, Gray's harbor. He could not even have accurately studied Meares report, for he does

* See Meares' Voyage, page 164.

not even speak of Shoalwater bay, and scarcely indicates a bay on his chart. He has only Shoalwater cape.

This may, perhaps, be the reason why the bay was so utterly neglected by subsequent navigators, and that even Wilkes, on his general chart of 1841, has not indicated this bay at all; and was, like Vancouver, only a shoalwater cape.

The great extent and interesting nature of Shoalwater bay have only been thoroughly developed in late years by the explorations of the Coast Survey. The first good survey of this bay was made by Lieutenant Commanding Alden in 1852.—(See his minute chart of it in Coast Survey Report, 1853.) He discovered the two channels of entrance, and gave to the northern cape the name Toke Point, and to the southern the name Leadbetter Point. Perhaps for Toke Point the old name of Meares, Cape Shoalwater, to be found on so many charts, might be restored.

GRAY'S HARBOR, 46° 56' NORTH LATITUDE, 124° WEST LONGITUDE.

From Shoalwater bay to the north for about fifteen miles the coast presents the same appearance as to the south of it, characterized by a broad flat beach, which presents a great highway between Shoalwater bay and Gray's harbor; this beach may be regarded as the extension of Weather beach, and is bordered inland by the corresponding low, heavily wooded sand hills. At the northern end of this beach lies Point Harrison, the southern entrance cape of Gray's harbor.

Gray's harbor is a large basin of triangular shape, each side of the triangle being about fifteen miles in length.

The entrance to this lagoon lies at the middle of the base of the triangle. The opposite vertex lying to the eastward, exactly opposite the entrance, so that the whole configuration may be compared to the shape of an arrow head.

A bank extends directly across this entrance, joining the opposite capes. This bank has only one opening or passage, about two-thirds of a mile in width and from four to eleven fathoms in depth. But on the outer side this entrance has again a narrow bar with only eighteen feet depth of water.

From this point the depth increases towards the east, the greatest depth being between the entrance points of the bay, where the depth is fourteen fathoms; thence towards the interior of the bay the depth decreases and shoals very regularly to all sides of the harbor.

The shores of the bay being surrounded by broad sandy or muddy flats which are dry at low water, and form extensive salt marshes.*

The river Chehalis enters the bay at its eastern extremity. Another small river also enters the harbor, called Gray's river.

This bay was completely overlooked by the Spaniards, by Berkeley, by Meares, by Vancouver, and by all those who visited it before the American Captain Robert Gray, who discovered it on the 7th of May, 1792. He entered it, found it to "be well sheltered from the sea by long sand-bars and spits," and remained here at anchor three days, engaged in trading with the Indians. He named the harbor Bullfinch, in honor of one of the wealthy Boston merchants who had fitted him out.†

Gray appears not to have given any names to the two entrance capes of the harbor, which he probably only called north point and south point.

* See plan of Gray's harbor, Vancouver's Atlas.

† Greenough L. C. P., 235.

It was soon after (October, 1792) again visited by Lieutenant Whidby, one of the officers of Vancouver, who, while at Nootka sound, had heard of Gray's discovery, and who despatched his lieutenant, in the ship *Dædalus*, for a particular survey of the bay.

Whidby and Vancouver gave to the bay the name of the American discoverer, and called it Gray's harbor; and this name was continued because Vancouver had once published his surveys and discoveries, which was not done by the American shipmaster. It thus came that the name of Bullfinch harbor was dropped, and it is not found on any map. On some charts the name of the second explorer and the first scientific surveyor of the bay (Lieutenant Whidby) is introduced. This has been done even on American charts, but the name of Gray's harbor has at last prevailed.

Lieutenant Whidby gave the names also to the two entrance capes. He called the northern Point Brown, in honor of Captain, afterwards Admiral Brown.

This point has a hook shape, like Cape Disappointment, and affords the boldest shore found in Gray's harbor and the best anchorage.

To the southern cape Whidby gave the name Point Hanson, in compliment to Lieutenant Hanson, who commanded the *Dædalus* when she came out from England. On our modern American charts this name, probably by mistake, has been changed to Point Harrison. This point is much lower than Point Brown.

Whidby's survey of the harbor, the first ever made of it, is given in Vancouver's Atlas. On this survey the bay is represented as everywhere surrounded and closed by wooded hills; nothing of the river's entering it is indicated.

The agents and traders of the Hudson Bay Company, who often travel through this region from Fort Vancouver to Puget Sound, discovered to the east of Gray's harbor an Indian tribe, the Chehalis, and a river called after them the river of the Chehalis.

Commodore Wilkes, in 1841, sent out from Puget Sound Lieutenant Eld to survey this river, and also Gray's harbor, which he did. He called the northern *part* of the bay, which is particularly *dotted* with shoals without any channels, Useless Bay*.

POINT GRENVILLE, 47° 18' NORTH LATITUDE, 124° 13' WEST LONGITUDE.

From Gray's harbor the coast begins to tend perceptibly towards the west, but from Point Brown, for about seventy-five miles, it still presents a low, uniform, unbroken appearance.

From Point Grenville it is broken and more elevated, and the whole aspect of the coast, from here to Cape Flattery, changes. Several small rocks lie off this point, one of which is perforated.

The extremity of Point Grenville forms, as it were, a bastion of rocky bluffs, and behind this bastion a single high peak is seen. We can consider Point Grenville as the northern limit of the extensive country on both sides of the Columbia river, embracing about eighty nautical miles.

From all these circumstances, Point Grenville attracts the attention of those who come from the south, and Heceta, as well as Vancouver, when they saw it, sailed at once to it, leaving Shoalwater bay and Gray's harbor unexplored to their right. Heceta, 1775, called this point Punta de los Martizes, (the Point of the Martyrs,) from the circumstance that some of the men were here killed by the Indians.

Vancouver named it, on the 28th of April, 1792, Point Grenville, in honor of Lord Grenville.

On the Spanish charts of the Sutil and Mexicana it is called "Punta de la Bastida,"† which

* See Eld's Expedition, Wilkes, vol. 5, from page 124 to 134.

† Bastida is an engine for covering approaches.

may be translated the Point of the Bastion, and which contains, no doubt, an allusion to the shape of the bluffs at the extremity of the point.

Vancouver observes that a current appears to set upon this point, and thinks this to be the cause of several accidents which happened here in former times to English as well as Russian and Spanish vessels, and perhaps, also, of the remarkable occurrence of the wreck of a Japanese junk, which happened here in the year 1833.*

DESTRUCTION ISLAND, $47^{\circ} 42'$ NORTH LATITUDE, $124^{\circ} 27'$ WEST LONGITUDE.

Destruction island is the largest detached piece of land on the whole western coast between Point Conception and Cape Flattery, though it is only six miles in circumference. It lies about thirty nautical miles to the northwest of Point Grenville, the coast presenting no remarkable points between Point Grenville and Destruction island. It is distant from the main land only about two miles. The greatest length of the island is from north to south.

The island has a rocky, abrupt, somewhat elevated coast, but is nearly flat on the top, the surface presenting somewhat the form of a table-land. It presents a barren aspect, and produces only one or two dwarf trees at each end.

The part of the coast in the vicinity of this island may have been seen by Drake in 1578, who is said to have advanced as high as 48° north latitude; but we have no particulars concerning this part of his voyage.

It was first recognized by the Spanish expedition, under Heceta, 1775. Heceta, coming from the south, approached this region in the beginning of July with the intention of searching for the Strait of Juan de Fuca.

He met here with the misfortune of losing seven of his men, who were sent on shore for water and were attacked and killed by the Indians, and his boat taken. From this event a little bay or inlet on shore was called "Enseñada de los Martires," (the Inlet of the Martyrs.†) Perhaps this name was chosen in allusion to the religious appellation of the day, the thirteenth of July, on which this happened, and which was the day of San Anacleto and of the five hundred martyrs.‡

Nararate puts the Enseñada in $47^{\circ} 24'$. The chart of Maurelle has, therefore, a "Punta de los Martires," and indicates pretty clearly with it our Point Grenville, but subsequent Spanish charts§ put the Enseñada and Rio de los Martires to the north of Destruction island. This island was named on that occasion "Isla de Dolores," (the Island of Sorrow,) perhaps because the officers and crew of both ships communicated there about the painful event, and had there that sorrowful consultation about the question whether they should revenge the murder of their companions or not.

To the open bay on the coast to the north of Destruction island Meares gave the name Queenhithe. Queenhithe is said to be a village on the Thames, near London. I believe, however, the predecessor of Meares, Captain Berkeley, had already given this name to this locality. The name has, however, disappeared from the charts.

A view of Destruction island and the neighboring coast is contained in the Coast Survey Report of 1855.

* See Vancouver's, vol. 1, page 211.

† See Nararate, Introduction, XCIV.

‡ See Calendario Manuel de Mexico por 1791, p. 18.

§ For instance, those of Sutil and Mexicana.

FLATTERY ROCKS, $48^{\circ} 11'$ NORTH LATITUDE, $124^{\circ} 43'$ WEST LONGITUDE.

The coast from Destruction island northward presents a broad, open bay which affords no protection, and which, as already observed, was called by Berkeley and Meares Queenhithe. The shores of the bay, as well as the coasts further north, are lined with rocks.

On the Spanish charts we find in this region an "Ensenada de Mojos," a little south of the 48° north latitude. This inlet and name are not only indicated on the charts of the Sutil and Mexicana, but also on other Spanish charts of about the year eighteen hundred. The English Admiralty charts have also a "Puerto de Mojos," but I know nothing concerning the history of the name.

The most remarkable group or reef of rocks on this coast is to be found in $48^{\circ} 11'$ north latitude, and is called on the modern American charts the "*Flattery Rocks*." From 48° north latitude to these rocks the coast trends directly north. These rocks form a series of irregularly shaped islets, more than twelve in number, and extending about one league from the shore. The three largest have a number of trees growing upon their tops and eastern slopes, which are not so rocky and abrupt as the western slopes towards the ocean.

The Flattery rocks have from the south an appearance somewhat like Cape Flattery. Here, as well as at the cape, the continent projects in a rounded headland, and from both these headlands stretch out chains of little rocks and islands towards the west.

On the 22d of March, 1778, Cook saw three rocks from a distance, and, flattered with the hope that he would find a harbor in their vicinity, he called them and the projecting headland Cape Flattery. He found, however, no harbor, nor did he discover the entrance to De Fuca strait, but stood off to the south and afterwards to the west and northwest. He determined, however, the latitude of Cape Flattery to be $48^{\circ} 15'$ west.

Captain Berkeley, 1787, Meares, June, 1788, and Duncan, August, 1788, discovered the entrance to De Fuca strait and the entrance cape to the south of it, where they found an Indian village established, called "Classett," and an island called "Tatooche." Meares, on his chart, gave to this northwest cape of our territory the name "Tatooche," and more to the south, where our capes lie, he has Cape Flattery.

Captain Charles Duncan, who made the first chart of De Fuca strait entrance, has the rocks indicated but not named; he was, no doubt, the first who gave the name "Cape Classett" to what we now call Cape Flattery.*

When Vancouver arrived here, 1792, he passed the Flattery rocks, which he unmistakably describes at a mile distance, but he gave no name to them. He then sailed directly to the south entrance cape of De Fuca strait, where he looked out anxiously "for the point which Captain Cook had distinguished by the name of Cape Flattery." He could not entirely satisfy himself about this point, but at last came to the conclusion that the point which Duncan called "Cape Classett" was identical with that called by Cook "Cape Flattery."†

In the autumn of the same year (on the 14th of October, 1793,) Vancouver was again in this region, and again remarks that, having heard that the name Classett originated only in the name of an inferior chief, and was not a name of importance among the Indians, he resumed the appellation of Cape Flattery, which is supposed to be the original name given by Captain Cook to the south entrance cape of De Fuca strait; but, at the same time, he gave to the rocks

* See Duncan's chart, published by Dalrymple.

† Vancouver, L. C., page 218.

above described the name Flattery Rocks. On the American charts the names of Vancouver have been adopted; but the English Admiralty, who, with a great degree of probability, think that Vancouver was not exact in his views, and that Cook saw only the Flattery Rocks and nothing of the entrance of De Fuca strait, adopt on the Admiralty charts Cook's old name of Cape Flattery for the Flattery Rocks, and name the southern cape of De Fuca strait, with Berkeley, Meares, and Duncan, Cape Classett.*

On the old Spanish charts the Flattery Rocks are usually called "Islas los Deseados," which is probably intended as a translation of the English "Flattery Rocks."

A view of these rocks is contained in the United States Coast Survey Report for 1855.

CAPE FLATTERY, $48^{\circ} 23'$ NORTH LATITUDE, $124^{\circ} 40'$ WEST LONGITUDE.

From Flattery Rocks the coast runs for about eleven nautical miles to the north with a final trend to the west, and then turns abruptly to the eastward, forming the pointed headland named Cape Flattery. This short section of the shore is abrupt, rocky, and lined with small islets. There are on this coast some small indentations, bays, and points, which have received names on the old Spanish Admiralty charts, and which are to be found under the same names in the modern English charts. "*Puerto Alara*," "*Cape Alara*," "*Point Niseo*," are such names. Señor Alara was a Spanish officer, occasionally mentioned about the years 1792 and 1793, as being occupied with explorations in those regions from Nootka Sound. These names are not, however, found on our American charts.

The configuration of Cape Flattery may be described in the following manner :

The whole system of the Mount Olympus range of mountains, which has its highest peak far in the interior, near Hood's Canal and the Mount Olympus peninsula, terminate at Cape Flattery toward the northwest. Between De Fuca strait and the Pacific coast this peninsula becomes gradually narrower, and finally terminates in a small headland which, at its extremity, curves slightly to the westward.

This small headland is somewhat separated from the large peninsula to which it is annexed. First, on the north by a small bay, called Meare's harbor, which is connected by a valley with the low land and marshes to the south of the cape. This valley is densely wooded, but through it runs a small stream which, at the highest tides, renders Cape Flattery practically an island. This island has a somewhat triangular form, the base of the triangle being attached to the continent, and the opposite vertex projecting boldly into the Pacific ocean, forming the cape called Cape Flattery.

The cape is five or six hundred feet high, and falls off to the water by steep, rocky bluffs. The extremity of the cape is, furthermore, broken up into a series of rocky islets, which stretch for about three miles out into the Pacific.

These islets diminish in size with the distance from shore, "Tatooche island" being the nearest and largest, and "Duncan's Rock" the outermost and smallest.

The natural features of this cape are in many respects similar to the locality described as "Flattery Rocks," but there are distinguishing features; the promontory of Cape Flattery is higher, its islands are lower and more flat-topped. The islands of Flattery Rocks are wooded; the Cape Flattery islands sustain nothing but a growth of grass.

We will first give a general outline of the history of the cape, and then consider the parts of which it is composed separately.

* Vancouver writes Classett, while Duncan writes Claaset.

Though the cape *may* have been approached or seen at a distance by former navigators—by Drake, who is said to have advanced as far north as 48° north latitude; by Juan de Fuca, who is *said* to have entered the strait of which this is the southern headland; by old Dutch navigators, who *pretended* to have found an entrance somewhere in this region—still it is a remarkable circumstance that this extreme point of the coast of America has been comparatively a late discovery.

Point Conception, Cape Mendocino, Cape Foulweather, Flattery Rocks to the south, the capes of Vancouver's Island, and other capes to the north, were known long before this cape was mentioned.

Many Spanish as well as English exploring expeditions, before the year 1787, passed along this coast from the south far to the north without perceiving this headland.

It is true that the Spaniards had a kind of pretension to an early discovery of the cape, made in 1775. The Spanish pilot, "Juan Martinez," who accompanied in that year the expeditions of Heceta and Bodega, said that he remembered to have seen on that occasion, beyond 48° north latitude, a cape and an entrance. But he said so only after the undoubted discovery of the cape and entrance by the English fur traders, (after the year 1787.)

In the accounts of the expedition of 1775 we find no allusion to this event, and on Maurelle's chart of this expedition no such cape or entrance are found.

Nevertheless, the Spaniards, who believed the fact, gave on their charts to this point, in honor of the pretended discoverer, the name "Punta de Martinez."*

Though this cape projects far into the ocean, still there is to the north land which tends still more to the westward—the highlands of Vancouver's Island, the shores of which run far out towards the northwest.

This cape lies thus, as it were, hidden in a wide bay. Vancouver's Island is so elevated that the navigator sailing from the south gets sight of it first, and Cape Flattery must appear partially covered by these highlands.† This may, to a certain degree, explain the late date to the discovery of this cape.

Captain Berkeley (1787) is the first from whom we have certain knowledge that he saw the cape and sailed to it from the south coast of Vancouver's Island, where he was engaged in trading with the "Nitwat" Indians. He appears to have adopted for it the name Cape Classett, at least he mentioned an Indian village of that name in the vicinity of the cape.

Captain Meares (June, 1788,) followed the track of Berkeley, of whom he had received information concerning it. He saw the cape, but called it "Tatooche."

Captain Duncan (August, 1788,) was the first who made a chart of the cape and gave it the name "Cape Claaset."‡

He gave, also, a view of the cape, which, however, is very imperfect and fanciful. The American captain, Gray, rounded the cape again in 1789. He appears to have adopted for it the name "Cape Flattery." At least so we find it named on the chart Captain Ingraham made after information derived from Gray.§

Vancouver, as already related above, arrived at this cape in October, 1792, and named it Cape Flattery, because he thought it to be the point to which Cook gave this name. He

* See, for instance, the charts of the *Sutil* and *Mexicana*.

† See view of Cape Flattery and the highlands of Vancouver's Island on the charts of the United States Coast Survey.

‡ See the chart in Dalrymple.

§ See a copy of this manuscript chart in our collection.

surveyed the cape and its vicinity for the first time accurately, and put on his chart the name Cape Flattery.

After Vancouver, geographers seem to have been divided with respect to the name to be given to the cape. The English Admiralty adopt the name of Duncan and Berkeley, *Cape Claaset*; which is, strictly speaking, the name given to it by the real first discoverers. The American charts adopt the name of Vancouver, and call the promontory Cape Flattery.

TATOOCHE ISLAND is, as was before remarked, the largest of the islands of Cape Flattery. It is a small rocky, table-land, of an oblong shape, with steep shores and a flat top. It is half a league in surface, has a verdant appearance, without, however, bearing trees. A cove divides it nearly into two parts. It is united to the promontory by a ledge of sunken rocks, over which the sea often breaks with great violence.*

The rocks are conglomerate, but one part of it is basalt. One of the rocks between the island and Cape Flattery rises considerably above the water. It was called by Duncan "*the Pinnacle Rock*," and was said to be that famous rock column which is mentioned in the old reports on the pretended discovery of Juan de Fuca, and which was considered to be the very landmark of the Strait of Juan de Fuca. Duncan gave a view of this rock, and made it so column-like and conspicuous that he must have drawn it after Hakluyt and after nature. Vancouver could find nothing like this Pinnacle rock.

Duncan names this island Green island, probably from its verdant appearance.

Vancouver called it in his report the "*island of Tatoche*," but he has no name for it on his chart. The name was derived from an Indian chief on the cape, who is often mentioned in the account of Meares. Vancouver, V. E., and sometimes named "*Tatoochee*," or *Tatoochie*, or *Tootoosh*.

The Spanish accounts of that time, for instance those of "*Quimper*," one of the first Spanish explorers of De Fuca straits, often mentioned an Indian chief "*Tutusi*," which is probably the same on their maps; therefore, also, this island is named "*Isla de Tutusi*."†

A somewhat similar name of an Indian chief of De Fuca straits is mentioned in the account of *Valdes* and *Galiano*, namely, the chief *Tetacus*. Jewitt, who was long a prisoner among the Indians of Nootka Sound, year 1800, also mentioned an Indian chief Tootoosh; the name is in some instances corrupted to *Tatersh*. Some Spanish navigators‡ called the island "*Isla de la Punta de Martinez*," (the Island of Martinez Point.)

DUNCAN'S ROCK lies north, 8° west from Tatoche island, at a distance of not quite one mile. It rises first above the surface of the water, and the surf breaks over with great violence. Between it and Tatoche is a clear passage. Vancouver called it Duncan's Rock because he wished to commemorate this captain's name, whose excellent sketch he had on board. The English captain, *Kellet*, who surveyed this island in 1847, has on his charts still another smaller rock, about twelve miles to the northwest of Duncan's Rock, which he calls Duntze Rock, after Captain T. A. Duntze. No such rock has been found by the United States Coast Survey.

* Vancouver, volume 1, page 217.

† See for instance the maps of Sutil and Mexicana.

‡ For instance, Galiano and Valdes, in their account, page 42.

DE FUCA'S STRAIT.

SOUTHERN SHORE.

General history of the Strait of "Juan de Fuca," 48° 20' north latitude, from 124° 45' to 122° 48' west longitude.

The Strait of Juan de Fuca is the most remarkable inlet of the whole Pacific coast of the continent of America. It is bounded on the north by the southern shore of Vancouver's Island and other smaller islands, and on the south by the northern shore of the Mount Olympus peninsula. On the east it is terminated to a certain extent by the western shore of Whidbey island.

The strait has its western entrance between Cape Flattery, on the south, and Bouilla Point, a point of Vancouver's Island, between Port San Juan and Niterial sound, on the north.

Its general direction is from east to west, and its length is about eighty nautical miles. It sweeps at first somewhat to the southeast from Cape Flattery, and then turns more directly to the east.

The north and south shores of this strait are parallel as far as the southern end of Vancouver's Island, or to about the middle point of its length. Up to this point the strait has a general width of about eleven nautical miles. From the Race Rocks on the north, and Fresh-water bay on the south, exactly the middle point of the whole extent, the strait widens about twenty nautical miles, and afterwards presents more the aspect of a broad interior basin. It is no longer bounded by straight parallel shores, but branches out into several broad passage bays and channels.

There are, therefore, two very distinct divisions of the Strait of Juan de Fuca—a western division, between Cape Flattery and Cape Church, which may be called *De Fuca strait proper*, and an eastern division, between Cape Church and Whidbey's island, for which there ought to be a particular name. Upon the Coast Survey charts it may be regarded as a part of what is called Washington sound. This name appears also to include the great central channel of the Deharo Archipelago.* *De Fuca strait* is very deep throughout its whole extent. In mid-channel its average depth is one hundred fathoms, and this depth is carried near shore on both sides. It commences shoaling perceptibly at a distance of two miles from shore; in all the channels and branches of this strait the depth is equally great.

There are no impediments to navigation throughout the whole extent of this strait. A deep sea bank is found at the entrance of the strait, which is a favorite fishing bank for the Indians in the vicinity.

La Perouse speaks of a bank in the latitude and longitude of the entrance, though the capes were hidden by fog.

He has this bank marked on this chart of the northwest coast. Captain Broughton† also speaks of this bank, and remarks that it bears west by north three or four leagues from Tatooche island. It was examined by Lieutenant Commanding Alden, of the United States Coast Survey, in 1855, who found upon it a depth of forty fathoms. It may exert, however, some influence on the currents of ocean, and may divide those that enter the strait. The only exceptions to the general free navigation of the strait are a few kelp-fields which are found in

* See chart of Washington sound, Coast Survey Report, 1855.

† Broughton's Voyage, L. C., page 55.

the eastern part of the strait, and which are usually formed upon rocky bottom, with comparatively low soundings upon them. Four such kelp fields have been discovered and marked upon the charts of the Coast Survey. One, south of San Juan island, at a distance of two miles from the shore, in latitude $48^{\circ} 25'$ north, longitude $122^{\circ} 57'$. It is about two miles in circumference, and has a depth of three fathoms of water upon it. Another lies south of the same island, at a distance of seven miles from it, in latitude $48^{\circ} 22'$, longitude $123^{\circ} 3'$, of about three miles in circumference, and has a depth of five fathoms.

A third lies west of Whidbey's island, four miles from shore; is about three miles in circumference, with a depth of from seven to ten fathoms of water.

A fourth and much larger kelp field lies west of Smith's island, and this little island, with its kelp and sand banks, is quite conspicuous. It lies quite separate from all other islands, and we will give a description of it here, because it may be regarded as a particular feature of the cape itself.

SMITH'S ISLAND lies nearly in the middle of the broad eastern extension of De Fuca strait, latitude $48^{\circ} 19'$, longitude $122^{\circ} 52'$. It is very small, being only a little more than a mile in circumference. It terminates to the east, in a narrow sand bank of about a mile in length, and not more than six feet broad. This sand bank rises from the water and forms the eastern extremity of the island. Thence the island rises gradually, and increases in breadth to the west; it attains, however, no greater altitude than fifty feet, with perpendicular bluffs of clay and gravel. Its surface is covered with a growth of bushes.

A small part of the above-mentioned bank to the east of Smith's island is always above water, and is called *Minor island*. At very low water both islands are connected. Between these islands, on the north side of the bank, good anchorage is found.*

The kelp field attached to Smith's island on the west is the largest on De Fuca strait. It has a triangular form, with a pointed angle to the west of about four nautical miles in circumference, with average soundings of about six to eight fathoms. Smith's island lies exactly in the central line of De Fuca strait, and has always been considered a landmark for entering the strait. The Spanish officers of the *Sutil* and *Mexicana*, in the year 1792, mention it as such. It is now the site of a light-house erected by the United States government.

The island was discovered by De Francisco Elsia in 1791, and named *Islas de Bonilla*, (Bonilla islands,) after a certain Spanish officer, Antonio de Bonilla.

Vancouver puts down the island without a name. Wilkes (1841) called it Blunt's island, after Lieutenant Blunt, who surveyed it with him and discovered an extraordinary configuration of the island, which had not before been truly recognized.

Smith's island is probably a name introduced by the Hudson Bay Company. It is now in general use. A special survey of this island was made in 1853 by Lieutenant Commanding James Alden, United States Coast Survey, whose sketch of it was published in the Coast Survey Report of 1854.

Upon the currents and wind of De Fuca strait few observations have been made. Wilkes† says that the winds for a greater part of the year blow directly through the strait, and generally outward, and sometimes very violently. Lieutenant Wood, of the *Pandora*, says, on the contrary, that the prevailing winds of the strait are from the southwest, making the northern shore a lee shore.‡

* Coast Survey Report, 1855. † Wilkes' Exploring Expedition, vol. 4, p. 296. ‡ Nautical Magazine, 1851, p. 317.

The tides of the strait seem to be affected by various causes, and are, consequently, subject to great irregularities.

The shores of the strait in the western part are bolder than those in the eastern, and on the southern side the land rises higher than on the northern, where it ascends more gradually.

In the eastern division of the strait are found numerous beautiful harbors, which are not so frequent in the western part and in the strait proper. * * * *

It is not at all improbable that the entrance to this broad strait was seen by early navigators, of which we have lost the original historical accounts. That a certain Greek pilot, in the Spanish service, Juan de Fuca, (or Apostotos Belerianos,) entered a strait in about this latitude in the year 1592, was generally believed during the seventeenth and eighteenth centuries, and on nearly all the maps of that time, therefore, a strait was laid down between 45° and 48° north latitude. It was usually called by geographer's "*De Fuca's strait*," or "*the supposed strait of Juan de Fuca*." It was at one time supposed to be the same as the so-called "Strait of Anian," which was supposed to be the western end of Hudson bay, and to open the passage to the North American continent.

It is even possible that a navigator not only entered De Fuca strait, but also its southeastern branch, (Admiralty Inlet,) and that such a navigator seeing that Admiralty Inlet ran directly south, thought it might be the northern part of the Gulf of California, and that in this manner the report and idea originated that the whole of California was an island. *This is all possible*, but there is no authentic proof of it whatever. The first navigator whose tracks can be followed with the sure light of history did not reach the latitude of De Fuca strait; Ferrelo Cabrillo, (1543,) Viscaïne, (1603,) and Aquila reached about forty-three north latitude as their northern limit.

Drake approached nearest to the strait; in 1579 he returned from forty-eight degrees north latitude.

The first of the modern northwest coast explorers, from 1774 to 1787, all passed the latitude of the strait, but did not see it, probably, because its entrance is somewhat hidden by the appearance of a large bay between the west shore of Washington Territory and the southwest shore of Vancouver's Island which stand toward each other at an angle of about 120° , in the interior corner of which the strait enters.

Perez, 1774, passed the mouth of the strait at a distance of sixty nautical miles, sailing from California directly to Vancouver's Island (to Nootka Sound.)

Bodega and Quadra, 1775, approached this strait as near as Drake, in 48° north latitude, where they saw the coast near Destruction island. But from there they, also, passed the mouth of the strait without seeing it, and sailed directly to the coast of Vancouver's Island. It is true one of their pilots, Martines, thought afterwards that he remembered to have seen the mouth of the cape on this occasion, but this is not proved.

Cook, 1778, passed this strait, like Perez, at a distance of sixty nautical miles, from northern California to Nootka Sound.

La Perouse, 1786, came very near to the entrance of the strait, and discovered there a deep sea bank, but probably cloudy weather prevented him from discovering the strait. He has, however, on his maps here *détroit soup çonné*, (a suspicion of a strait,) if this is not an addition of the editors of his map.

Captain Berkeley, the commander of a fur trading expedition, who explored the inlets and channels of Vancouver's Island, 1787, to the south of Nootka, for the fur trade with the Indians,

was the first who, undoubtedly, not only saw the strait, but also crossed over its mouth. He unhappily published no report and chart of this discovery, but made, however, some communication about it to his countryman, Captain Meares, of the English Fur Trading Company, to whom he, also, seems to have suggested the idea that this might be the famous De Fuca's strait of the old chart.

Meares, following the track of Berkely, visited this whole region, and also the strait again in the year 1788; he explored, also, the interior strait a little further, sending a boat, under the command of his mate, *Robert Duffin*, into it.

Very soon after Meares, in August, 1788, Captain Charles Duncan arrived at the mouth, and made a sketch of it, in which, however, only the very entrance in the vicinity of Cape Classet or Flattery is laid down, with some degree of minuteness.

All the interior part of the strait, for about thirty miles eastward, is laid down on this chart with uncertain outlines, as if the shores had been seen from a distance.

This chart by Duncan was the first special chart ever published of the strait.

It was made on the 15th of August, 1788, and published by Dalrymple on the 14th of January, 1790. The name of "Strait of Juan de Fuca" is given to it in the title.

Meares published in his great work, in the year 1790, his own as well as Berkely's and Duffin's discoveries and observations on the strait. This work and chart are a little later than that of Duncan. Meares' chart is dated 28th of November, 1790. But the strait is already prolonged on it towards the east, and the bend in its central part is indicated. In the year 1789, the American captain, *Robert Gray*, entered the strait, and passed, as he himself asserts, as far as fifty miles up into the interior.*

Mr. Greenough believes that soon after Gray, (1789,) the American captain, Kendrick sailed through the whole strait, and came out again through Queen Charlotte's sound; but this cannot be proved by historical documents.

The Spaniards, soon after, made a series of explorations, by which the whole strait was thoroughly reconnoitered, surveyed, and laid down on charts. The first of these expeditions was that of the ship "Gertrudis," in the year 1789, under Don Gonzalo Lopez de Haro, sent out by Don Estevan Martinez, the Spanish commander at Nootka, who, as I have already said, believed himself to be the first discoverer of the entrance of the strait. Some authors think that not Haro, but Don José Maria Narvaez, commanded this expedition.

The Gertrudis sailed along the southern shore of Vancouver's Island, as far as the entrance of De Haro's strait. The next year, (1790,) the strait was explored by Don Manuel Quimper, who passed along the southern shore as high as "Puerto Quadra," or our Port Discovery.

In the year 1791, a third Spanish exploring expedition entered the strait under Captain *Francisco Elisa* and Joseph Narvaez, who passed for the first time through the whole strait, and entered to the north of the Gulf of Georgia. Their *ne plus ultra* was about the mouth of Fraser's river.

In April, 1792, Vancouver, who was not acquainted with all those Spanish explorations, entered the strait and again surveyed it. He explored, also, many branches of it, which the Spaniards had omitted, (for instance, the interior of Admiralty Inlet,) but he also omitted several harbors which his Spanish predecessors had already explored, (for instance, the harbors on the south shore, between Port Discovery and Cape Flattery.)

In June, 1792, a fourth Spanish expedition, particularly destined for De Fuca's strait, the expedition of the ships *Sutil* and *Mexicana*, under Captains Jaliano and Valdes, entered the

* These assertions are given in Vancouver, vol. 1, p. 214.

strait. But they could not add much to a knowledge of the western part of the strait, which had been already pretty well explored. They finished, in company with Vancouver, the survey of the Gulf of Georgia.

During the present century, the officers of the Hudson Bay Company have explored the strait in every direction, but have published little or nothing about their operations.

In the year 1846, Captain Kellet, in the ship *Herald*, and Lieutenant Wood, in the ship *Panderer*, again explored many parts of the strait, especially its northern shore.

In the year 1852, the operations of the United States Coast Survey were extended to this region, and detailed surveys are now actively progressing. Preliminary charts of most of the important harbors, passages, and inlets have already been executed and published. The strait has always retained the name it now has.

It is very probable that De Fuca strait, from its remarkable geographical position, will, in course of time, prove to be the most important entrance from the Pacific ocean on the whole northwest coast of America. It will surpass, with respect to commercial and naval advantages, all its rivals to the north and south. It is the outlet of that great and fertile valley into which Admiralty Inlet branches, filling it with innumerable excellent harbors, and the greatest facilities for navigation. And also of that still greater northern valley which is partly occupied by the Gulf of Georgia.

The valley of the Fraser's river, therefore, must also be considered as an appendage of De Fuca's strait, and as having there its real oceanic embouchure.

Furthermore, the entrance to the Columbia river, with its sand banks and breakers, will at all times be inconvenient, compared with the broad, deep, safe navigation of De Fuca's strait; and when these countries become densely settled, and railroads come to their aid, a great part of the trade of the Columbia river valley may possibly be drawn towards Puget Sound.

The great North Fork of the Columbia, which, for the greater part of its upper course, flows upon the parallel of De Fuca's strait, will soon be connected with it. That river, to a distance of about seventy miles, flows directly to Admiralty Inlet; it then turns by a right angle to the south and west, and reaches the sea after a most circuitous route of more than 400 miles; and besides, this water communication is very much interrupted by cataracts and rocks. The isthmus between Admiralty Inlet and the angle of the Clark's Fork may be traversed by roads and perhaps by canals, so that the whole northern half of Columbia river may become dependent on De Fuca's strait. Even the lower regions of the Columbia have a near approach to salt water by Puget Sound.

Finally, the North Fork of the Columbia river carries with it, so to speak, the Upper Missouri, which flows along the same parallel, and brings the navigable waters and fertile valleys of the east very near to it. This is not so much the case with the South or Lewis' Fork of Columbia river.

This immense system of commercial connexions we see, even now as it were, foreshadowed on our railroad maps, where one of the principal projected lines which commenced at Chicago and Lake Superior has its western terminus at Puget Sound and De Fuca's strait.

THE SOUTHERN SHORE OF DE FUCA'S STRAIT, $124^{\circ} 4'$ —————, $122^{\circ} 13'$ WEST LONGITUDE.

The southern shores of De Fuca's strait are hills, in the immediate neighborhood of the water, of a moderate height. Many low sandy cliffs fall perpendicularly on beaches of sand and stone. From the top of the cliffy eminences the land takes a further gentle and moderate

ascent, and is entirely covered with trees, chiefly of the pine genus, until the forest reaches a range of high craggy mountains, which seem to rise from the woodland country in a very abrupt manner, with their summits covered with snow. The northern shore is not quite so high. It rises more gradually from the sea side to the tops of the mountains of Vancouver's island, which gives to them the appearance of a compact range, more uniform and much less covered with snow than those of the southern side.* The eminences with which the whole coast is lined have nearly all, more or less, the same form. They form little peninsulas, which all point to the northwest. The northeastern sides of these peninsulas are long, the northwestern short, and between two neighboring points lies usually a little bay, the shores of which are low and sandy.

Taking a more general view of the coast, it may be said to be developed in a straight line from west to east, without any far projecting headlands and peninsulas, and without deep and long bays and indentations.

Nearly all the bays and harbors along the shore are broad, shallow, and afford no good protection. Only towards the eastern part some deep inlets appear, which become deeper and longer the more we advance to the east. First, New Dungenes harbor; then Discovery harbor; then the very long Hood's Channel; and last—the longest and widest of all—Admiralty Inlet.

The latter two great inlets will be considered in a particular chapter, and we will adopt Wilson Point as the terminus of this particular section of the coast.

NEEAH HARBOR, 48° 21' NORTH LATITUDE, 124° 37' WEST LONGITUDE.

Of all the small bays of this section Neeah harbor is the most interesting, and has been longest known. It is a well protected bay near Cape Flattery, and has been visited by all who have explored the vicinity of the cape.

On passing Cape Flattery and entering the strait, the rocky shore recedes to the south and again turns towards the east, forming a little bay, which is closed on the northeast by a small island called "*Waadda* island" or Wyadda island.

A narrow but safe passage for vessels of ordinary draught separates this island from the main land. The body of the bay itself contains no hidden dangers, and has regular soundings from 12 to 5 and 4 fathoms depth of water.

The eastern part of the bay shore is low and sandy, but the western part is lined with a ledge of rocks projecting irregularly above the bottom. This ledge of rocks is partly lined with a field of kelp, which affords protection against the swell of the sea. The best anchorage for large vessels is close to the kelp, but smaller vessels can anchor at all seasons in the channel between the shore and *Waadda* island.

This bay may be considered as a part of the valley which runs behind Cape Flattery from De Fuca's strait to the Pacific ocean. The bay is about four miles deep, and along the inner shore lies an elevated beach, upon which the famous Indian village *Claaset*, which gave its name to the locality, was situated. This beach is the site of an Indian village to this day.

The first chart on which Neeah bay was laid down is that of Captain Duncan of the 15th of August, 1788, but it was imperfectly represented, and without a name. That *Waadda* island is indicated (though not in its right place) is sufficient proof that Neeah bay is meant. Duncan did not pass to the eastward of this bay. The Spaniards were the first to know a little more

* Vancouver, vol. I, pp. 220, 221.

about it. It was called by them, as early as 1790, (during the expedition of Quimper to De Fuca's strait,) "Puerto de Nunez Gaona," the port of Nunez Gaona.

In April of the year 1792 Vancouver passed the bay. He mentions and describes it in his report, but gives no name to it, and did not find it worth his while to anchor there, because he was in expectation of finding better ports to the east.*

Soon after, in the summer of 1792, the Spanish marine officer, Don Salvador Fidalgo, was sent to this port from Nootka to establish a Spanish settlement and erect fortifications.

Some weeks after the port was again reached by the expedition of the Sutil and Mexicana, (June, 1792,) the officers of which had an interview with Fidalgo.† They say that the Indian name of the harbor was "*Quinacasnot*."

Greenough says that the American traders call this harbor "*Poverty Cove*," but on the manuscript chart of the Americans, Gray and Ingraham, I find the name "*Poverty Cove*" given to San Juan's harbor, on the northern shore of De Fuca strait. They (Ingraham and Gray) call this harbor "Fidalgo's cove," I suppose the name Neeah harbor was first introduced by the Hudson Bay Company.

Wilkes, who in 1841 surveyed the harbor, gave it the name "Port Scarborough," in honor of Captain Scarborough, an officer of the Hudson Bay Company, who gave some assistance to the American exploring expedition; but the little island to the northeast of the bay he called "*Neeah Island*."

To different points or capes of the bay he gave the names "Point Hilcome," the Western Cape, Newell Point; in the middle of the harbor, "Point Lewbough," and Village Point to the east.

Captain Kellet of the English royal navy surveyed the harbor again in 1847 and called it "*Neeah Bay*." He names the little island Wyadda Island, Wilkes' "Point Hilcome," Koikla Point, and "Village Point," Mecena Point.

The author of the account of the voyage of the Sutil and Mexicana, in his dictionary of the language of Vancouver's Island Indians, has a verb "ne-as," which he translated by "salis," (to sail out.) May not this word perhaps have something to do with the appellation of the island and harbor "Nee-ah?"

Lieutenant Alden and Mr. Davidson surveyed again the harbor in 1852 and they adopted more of Kellet's than Wilkes' names. The eastern cape of the bay they called neither "Village Point" nor Mecena Point, but Baadah Point, because they found out that the name of the neighboring Indian village was "Baadah." Their interesting and beautiful survey of the bay and of the whole section of the south shore of De Fuca's strait, from Duncan's rock on the west to "*Kashn Kuddil Point*" on the east, is contained in the Coast Survey Report of 1853.

FALSE DUNGENESS BAY, 48° 7' NORTH LATITUDE, 125° 27' WEST LONGITUDE.

The coast from "Neeah bay" sweeps at first a little to the southeast, and turns then with a gentle bend directly to the east along the parallel of 48° 10' north latitude. It forms innumerable little points and bays, of which some were explored and named by the Spaniards. But "False Dungeness," 60 nautical miles distant from "Neeah," is the first harbor of importance.

The names of the old Spanish admiralty charts of 1795, along this section of the coast, are, from west to east the following:

* Vancouver, vol. I, p. 218.

† Sutil and Mexicana, pp. 29, 30.

Emenada de Roxas (the Bay of the Red Women) is about 24 miles to the east of Puerto de Nunez Gaona, ("Neeah bay.") and is probably our "Callam bay." The Spanish officers of the Sutil and Mexicana give for it as the Indian name "Isfual."*

After this comes "Ensenada de Soto," which is called Callam's bay in the surveys of Kellett and Woods. Then Rio Canil, (the River of Coarse Bread.) It is called to this day *Canil river*. The Spanish officers of the Sutil and Mexicana gave it the original Indian name "*Chismil*."† Further: Rio de Causto, (the River of Gradual Descent,) the same perhaps as our "Crescent bay." The Indian name of this inlet is said by the Spaniards to be Sejachio.

"Ensenada de Davila," (Davila's inlet.) This is a larger bay, and is probably the "Fresh-water bay" of the American and English charts.

All these Spanish names originated partly in Quimper's, partly in Elisa's exploring expedition of this shore, (1790, 1791.) The Spanish officers of the Sutil and Mexicana give for it the original Indian name "Wcunas." * * *

False Dungeness is, so to speak, the first attempt of nature on this coast to form a good harbor. A low sandy and very narrow spit of land sets out from the coast and runs east about three miles. It forms and bounds with the coast a bay of two miles broad and of a regular oval shape. The harbor has surprisingly deep soundings of from 20 to 10 fathoms from its eastern entrance to its western end, and is also deep from north to south, and extremely well protected against the west, north, and south.

The harbor was discovered by either Quimper, (1790,) or by Elisa, (1791,) and called by them Puerto de los Angeles, (the Harbor of the Angels.) The name was retained by Vancouver and likewise on the English admiralty charts, and this is therefore doubtless the true name of the harbor.

On the Coast Survey charts it is called "False Dungeness," no doubt because the configuration of the port has some similarity to that of "New Dungeness," in the neighborhood. It was surveyed and sounded in the year 1852 by Lieutenant J. Alden, United States navy, assistant in the Coast Survey. On his chart, which is to be found in the Coast Survey Report of 1853, the Spanish name is retained only to the eastern extremity of the long sandy bay which covers the bay or Ediz Hook.

NEW DUNGENESS BAY, 48° 12' NORTH LATITUDE, 123° 10' WEST LONGITUDE.

From False Dungeness the coast extends a little to the north and sweeps back to the east, throwing out again a long spit of low sandy land very similar to that by which "False Dungeness" is formed. It lies at the northern extremity of a pretty large peninsula.

From the long sandy spit of land which covers the port to the north a branch runs out towards the south, which nearly closes the inner half of the bay and makes the entrance to it very narrow. The outer open part of the bay is deep and affords shelter against the west and northwest.

The bay was discovered by *Don Manuel Quimper*, in the year 1790, and named after him *Bahia de Quimper*, (Quimper's bay.) He called the long projecting cape or sandy tongue Puerto de Santa Cruz, (the Point of the Holy Cross.)

Vancouver, who, as I have said, ran quickly along this whole shore east from Cape Flattery, looking out for some more spacious and commodious harbor, did nothing for the particular

* Sutil and Mexicana, p. 42.

† Sutil and Mexicana.

survey of all the bays and indentations of the coast just named, which, however, had been explored and named before him by the Spaniards, of whose explorations Vancouver knew nothing, having with him only an imperfect sketch or beginning of a sketch of De Fuca's strait, by Captain Duncan.

This locality was only recognized by Vancouver in passing, and at a distance. It appeared to him to be something like the situation of Dungeness in the British channel, and he therefore called the sand promontory "New Dungeness," (April, 1792.)

Wilkes called the bay "*New Dungeness Roads*."

WASHINGTON HARBOR, 48° 5' NORTH LATITUDE, 123° 3' WEST LONGITUDE.

From New Dungeness bay the coast falls directly off to the southeast for the distance of 10 miles, and a very hidden and deep basin now called *Washington harbor*. The interior part of this basin is covered to the north by two projections, and there remains only a very narrow entrance a few hundred yards in width, which is not easily discovered. Before this entrance is a broad open space which may be called the exterior part of the bay.

The interior basin of Washington harbor is remarkably deep. It has from 9 to 20 fathoms depth, and is protected against all winds. In another position it would be a most valuable port, but in this region there are so many superior ports that even so good a one as this becomes of second rate importance.

Quimper and Elisa (1790, 1791) looked into this bay, though they seem to have had no idea of the existence of an interior basin. They have here the name "*Ensenada de Bertodano*," (Bertodano's inlet.*)

Vancouver sailed by this port without noticing it at all. He has on his charts no indication of it whatever.

Probably the port first became known to the Hudson Bay Company. Wilkes says that he sent a party to survey the coast (about the 20th of July, 1841) between New Dungeness and Protection island,† though he does not give the result of this exploration in his account. Still there is no doubt that it was on this occasion that the interior harbor was for the first time regularly surveyed. He has it plainly indicated on his chart. I do not know whether the name Washington harbor was introduced by Wilkes or not, but this name is now adopted on all our charts.

PORT DISCOVERY, 48° 5' NORTH LATITUDE, 122° 55' WEST LONGITUDE.

From Port Washington the coast runs again for a few miles to the east, and then again falls back to the south and forms another long and deep basin, "*Port Discovery*," very similar to the former, but much larger. This bay is about six miles long from north to south, and, throughout, 2 to 2½ miles wide from east to west. It is very deep, and has regular soundings from 30 to 35 fathoms in mid-channel to 10 fathoms close to the shore. In some parts it is almost too deep for an anchoring place. The entrance of the port is formed by two low projecting points, "*Challam Point*," to the west, and "*Cape George*," to the east. This entrance is much broader than "*Washington port*." Woodland cliffs of a middling height bound the coast of the interior basin. It is protected from all winds, and especially those of the north and northwest, by a little island, "*Protection island*," which is two miles from the entrance and covers it.

"Had this insular production of nature," says Vancouver, "been designed by the most able engineers, it could not have been placed more happily for the protection of the port."

* See Spanish Admiralty charts, 1795.

† See Wilkes' Exploring Expedition, vol. 4, p. 484.

From all this it is evident that this bay forms one of the safest and best harbors in the world. It is also very easy to fortify it against the attempts of an enemy. The first discoverers of it were, beside this, enchanted by the beauty of the surrounding landscape.*

Don Manuel Quimper was the first who discovered and entered this bay, (1790,) and who called it "*Puerto de Quadra*." It was the *ne plus ultra* of Quimper's progress in De Fuca's straits.† Don Francisco Elisa visited the port again in 1791, and continued the name of Puerto de Quadra, given to it in honor of the Spanish explorer Don Juan de la Bodega y Quadra. The Spanish officers of the Sutil and Mexicana assign to it as the original Indian name, "Chlayarnal."‡

Vancouver, who in search of a convenient port arrived here in April, 1792, and was unacquainted with the explorations of his Spanish predecessors, believed himself to be the discoverer of this beautiful harbor. He made it for a period the station of his ships, and called it after one of them "*Port Discovery*," and as he made his discoveries known throughout the world this name has remained to it ever since.

The little island before the port had been called by the Spanish discoverers Isla de Carrasco, (Carrasco's island.) There was among Quimper's men "El Piloten Don Juan Carrasco," (the pilot's mate Don Juan Carrasco.)§ Perhaps the island was called after him.

The island is a small detached piece of land, which, like the other islands near the coast of Washington Territory, resembles a table-land; its summit presents nearly a horizontal surface, an extensive lawn with luxuriant grass, and falls off to the water in perpendicular cliffs. From its good protecting qualities with respect to Port Discovery, it was called by Vancouver "Protection Island," (April, 1792.) The Spanish officers of the Sutil and Mexicana visited it soon after Vancouver, (June, 1792.)

They say that the original Indian name of the island was *Chuchanucah*.||

From Port Discovery the coast runs again a few miles to the east, and at Point Wilson falls off to the south, and forms another basin similar to those of Ports Washington and Discovery, and another peninsula similar to that which divides the last mentioned two ports. But this harbor, called "Port Townsend," opens towards Admiralty Inlet, of which it forms a part, and we will take it into consideration in connexion with that subject.

ADMIRALTY INLET, FROM 47° 3' to 48° 12' NORTH LATITUDE, 122° 30' WEST LONGITUDE.

Admiralty Inlet is a most curious, irregular, and complicated compound of inlets, channels, and bays, which leads to a narrow entrance from the southeastern corner of De Fuca's strait.

The principal body of these waters, taking the whole as one mass, runs in a directly north and south line through more than a whole degree of latitude; but branches run out from it in all points of the compass, and fill a region 70 nautical miles in length from north to south and 30 miles in breadth from east to west.

It may be compared to a tree, of which the body is recognizable, which is called Admiralty Inlet proper, and the side branches have their particular names.

On the whole west coast, from San Diego to the north, nothing like this is met, but from De Fuca's strait higher up the entire northwestern coast offers many other complicated channel

* Vancouver, vol. 1, p. 226.

† Manuscript journal of Quimper's voyage, in the library of State Department, Washington.

‡ Sutil and Mexicana, p. 42.

§ He is mentioned in the manuscript journal of Quimper's voyage, United States State Department, and he is also mentioned as one of the officers who afterwards signed a paper on the Spanish taking possession of the harbor of Nunez Gaona.

|| See their report, page 42.

systems very similar in their principal features to this. All the water channels of which Admiralty Inlet is composed are comparatively narrow and long. They have all, more or less, bold shores, and are throughout very deep and abrupt, so much so that in many places a ship's side will strike the shore before the keel will touch the ground.* Even in the interior and most hidden parts depths of 50 and 100 fathoms occur, as broad as De Fuca's strait itself. Vancouver found 60 fathoms near the Varhon island within a cable length of the shore, and in Possession sound he found no soundings with a line of 110 fathoms. Our modern more extensive soundings prove that this depth diminishes towards the extremities of the inlets and basins, and we will speak of it more at the particular descriptions of each part. A high tide goes up from De Fuca's strait into all these sounds. Even at Nisqually, the most southern part of Admiralty Inlet, the spring tides are 18 feet high and the neaps 12.†

Nothing can exceed the beauty and safety of these waters for navigation.* Not a shoal exists within them; not a hidden rock; no sudden overfalls of the water or the air; no such strong flaws of the wind as in other narrow waters; for instance, as in those of Magellan's strait. And there are in this region so many excellent and most secure ports that the commercial marine of the Pacific ocean may be here easily accommodated.

The country into which these waters enter, and of which they fill the lowest and central parts, may be said to be a broad valley, between the Mount Olympus range to the west, and the Cascade range to the east; the high snow covered peaks of both ranges may be seen from the waters everywhere. They stand at a distance of about 100 nautical miles from each other. The broad valley between them is, upon the whole, of a moderate elevation, and presents a pretty level depression. The higher spurs of the two mountain ranges do not come down to the water's edge. The shore lands, in the immediate neighborhood of the channels, may therefore be called only hills. They are partly handsomely wooded, partly covered with luxuriant grass. In this respect Admiralty Inlet differs from other similar sounds of the west coast to the north, where these sounds sometimes cut right into the heart of the high mountains, and offer some of the boldest, wildest and most picturesque coast scenery to be seen in the world.

The Admiralty Inlet valley or depression goes still on to the south, with a gentle bend to the southwest, towards the Columbia river. Between both waters no high mountain range intervenes, because the Mount Olympus range is a perfectly isolated system. It is from this, as I have already observed above, very possible that the northern waters once went right through, were connected with the Columbia river, and made of Mount Olympus peninsula an island.

All the waters comprised under the general name Admiralty Inlet may be said to consist of the following five divisions:

- 1st. The entrance as high up as "Suquamish head," where the principal separation begins.
- 2d. Hood's Canal, or the great western branch.
- 3d. The principal body of Admiralty Inlet proper, from Suquamish head as far south as to the narrows near Point Defiance, where the great body of the water ends.
- 4th. That southern cluster of sounds and inlets which is connected with Admiralty Inlet only by a very narrow channel, and which is called Puget Sound.
- 5th. Possession Sound, the great northeastern branch of Admiralty Inlet, which conducts into Rosario strait.

* Wilkes, vol. 4, page 304.

† Wilkes, vol. 4, page 305.

THE ENTRANCE OF ADMIRALTY INLET.

Our geographical nomenclature, unhappily, has not been organized by men who had the whole finished map of the country before them, who could analyze the different geographical objects into their component parts and subdivisions, and could give appropriate and special names; else no doubt that northern part of Admiralty Inlet between Wilson and Suquamish Point would have received its proper name. It forms in a certain degree a basin itself.

On the north it is separated in a marked manner from De Fuca strait, and to the south the waters branch out in different directions. For want of another name, we may call it "Admiralty Inlet Entrance." It forms a basin fifteen miles long from north to south, and ten miles broad from west to east, with a large island and peninsula and three harbors (Townshend, Oak Bay, Port Ludlow,) on the western shore, and several open bays on the eastern shore.

Quimper says, in his journal, that from his *Ne Plus Ultra* (at Port Discovery) he saw other inlets and openings to the east, which he called "Boca de Fidalga" and "Boca de Flora." He had, however, no time to explore them.

Don Francisco Elisa, who advanced in 1791 to the eastern end of De Fuca strait, recognized for the first time this inlet, and called it *Bocas de Caamona*, (the Inlet of Caamona,) probably in honor of the Spanish navigator, Caamona, who was then preparing for his great northwestern expedition, which he executed in 1792. On all the old Spanish charts Admiralty Inlet Entrance is called Bocas de Caamona, while they only call the further large interior body of the waters "Canal del Almerantzago," (Admiralty Inlet.)

It would not only have been just to the discoverer, but also very convenient, if we had adopted this manner of denomination.

Elisa, however, did not further explore the interior of this inlet, because he "understood from the Indians that, though it was very long, still, from the end of it, one could not advance further unless with canoes."* Elisa's object was not to explore shut-up inlets, but to find a passage to other waters. The original name of this entrance was ascertained by the Spaniards to be "Quenchenas."†

Vancouver sailed into the entrance (on the 7th of May, 1792,) with three boats, on a boat excursion from Port Discovery, where his ships were stationed. He gave to it the name of Admiralty Inlet, but he extended this name to the whole broad channel to the south.

Vancouver and his officers, in repeated excursions, surveyed for the first time all the principal branches connected with this inlet.

As the sea otter was not found in these waters, the American and English fur traders seldom or never explored them.

It was not surveyed by a scientific expedition for half a century after Vancouver.

The agents of the Hudson Bay Company became acquainted with the channels, but they have published no works or charts on it.

The American Exploring Expedition under Captain Wilkes made for the first time, after Vancouver, (1841,) an extensive survey of the whole, and completed discoveries in several parts, which we will describe more particularly hereafter. Since 1853 the United States Coast Survey has been extended over this field, and already many special charts of harbors and inlets have been published.

Point Wilson is the northeastern extremity of the hilly peninsula between Port Discovery

* Susil and Mexicana, p. 35.

† Ibid.

and Admiralty Entrance. It was named so by Vancouver, in honor of Captain George Wilson, of the British navy.*

Point Partridge is the most eastern headland of Whidby's island. It forms a white sandy cliff, received its name from Vancouver, and has ever since retained it.

PORT TOWNSHEND.

Port Townshend forms a basin which is, in all respects, similar to the western basins of Port Discovery and Port Washington. Like them, it extends from north to south about ten miles; like them, has very regular deep soundings, from 104 to 20 fathoms, and good holding-ground. It forms a most safe and spacious harbor. To the east it is covered and separated from Admiralty Entrance by a peninsula and by Craven's island. It forms a high, steep cliff of a rich species of marrowstone, and Vancouver, who examined it on the 8th May, 1792, therefore called it Marrowstone Point.†

Craven's island itself was not named by Vancouver, though he recognized it to be an island. It received its present name from Wilkes. It is about six miles long from north to south and a mile broad, and is separated by "Long Harbor" from a similar peninsula to the west.

"Long Harbor" is a narrow channel five miles long, which branches out from "Port Townshend," and empties through a very narrow and shallow passage to the south into Oak bay. It was first navigated through by Vancouver. Lieutenant Johnstone thought he might return to the north by Oak bay and Port Townshend, but he found these two bays separated and closed by a narrow isthmus.‡ The Indian name of the channel is Kelisut.

The eastern coast of Port Townshend is formed by a detached piece of country very similar to Craven's island, which has no proper name on our charts, but might be called Townshend peninsula.

Port Townshend itself received its name from Vancouver, in honor of the Marquis of Townshend, one of the lords of the English Admiralty who signed Vancouver's instructions. In the year 1854 an accurate survey of this port was made by the United States Coast Survey, the results of which were published in the Coast Survey Report of 1855.

OAK BAY.

Oak bay is a small harbor to the south of Port Townshend, from which it is separated by a narrow isthmus. Vancouver explored it on the 9th of May, 1792, and named it Oak bay because some of his young men on an excursion on shore had seen some high and beautiful oak trees.

PORT LUDLOW.

Port Ludlow is a little bay in the southwestern end of Admiralty Entrance to the northwest entry of Hood's Canal. It is slightly indicated on Vancouver's chart, but without a name. Wilkes surveyed it in 1841 for the first time, and called it after Mr. Ludlow, United States naval officer of the war of 1813, who was killed on board the ship Chesapeake.

An extensive survey of this port was made in the year 1854 by Messrs. James Alden, Davidson, and Lawson, from the United States Coast Survey, and a chart of it published in Coast Survey Report of 1856.

The bays and headlands on the eastern side of Admiralty Entrance are not very well defined,

* See Vancouver, vol. 1, p. 291.

† Vancouver, vol. 1, p. 235.

‡ Vancouver, vol. 1, p. 233.

not very deep and projecting, and they therefore have received no particular names by the great navigators and surveyors on their charts, though they have local names.

From this the only exceptions are made by "Admiralty Head" and "Ariel Point." Admiralty Head is a very marked headland of Whidby's island to the east of Wilson Point. It received its name of modern origin, probably from its vicinity to the entrance of Admiralty Inlet, and it may be called the interior entrance point of this inlet, whilst Partridge Point, on the same side, may be considered to be the exterior entrance cape.

Ariel's Point is the southern end of the east coast of this basin. Vancouver had no name for it.

"SUQUAMISH HEAD"

marks the southern entrance of this basin, and is the point where Admiralty Entrance begins to separate into two branches. It forms a high, perpendicular bluff, which terminates towards the north in what is usually called the great peninsula, and which divides Hood's Canal from Admiralty Inlet. This point was named by Vancouver "Foulweather Bluff" because he experienced there a disagreeable change of weather. Its present Indian name may have been given to it by the Hudson Bay Company.

Hood's Canal forms a very curiously-shaped sound which branches off from Admiralty Entrance towards the southwest, between Port Ludlow and Suquamish Point. Its main body runs directly from the northeast to the southwest, with a length of about 40 nautical miles, and a width of from 1 to 2 miles.

In the midst of its length a smaller inlet branches out to the north, and in its southern part suddenly turns around to the east and northeast under a very pointed angle, and finally ends in a long and narrow appendage.

Hood's Canal is throughout very deep, 50 to 60 fathoms in mid-channel, but in its eastern appendage its shoals from 30 to 5 fathoms. A strong tide runs up and down in the channel, the water of which rises to 10 feet.* The shores are alternately composed of sandy or rocky cliffs, falling abruptly into the sea or terminating on a beach, whilst in some places the even land extends from the water-side with little or no elevation.† The banks on both sides are formed of stratified clay, and do not exceed 100 feet in height.‡

The whole country surrounding this branch is less attractive and diversified, and of a more uniform appearance than that on the other parts of Admiralty Inlet.

Vancouver discovered and explored this canal in its principal parts, in a boat expedition, from the 10th to the 14th of May, 1792. He gave to it the name Hood's Canal, after Lord Hood, one of the lords of the English Admiralty, who signed his instructions.

It was again surveyed during the latter part of June, 1841, by a boat expedition commanded by Lieutenant Case, sent out by Wilkes from Nisqually. Case discovered parts of the bay which had been overlooked by Vancouver.

The principal points, capes, and divisions of the canal are the following :

"Port Gamble" is a little basin attached to Hood's Canal, on the eastern side, not far from the eastern entrance. It has a very regular, oval shape, with a narrow entrance with soundings of from 5 to 7 fathoms. It is indicated on Vancouver's charts, though without a name. Wilkes named it after Mr. Gamble, an United States naval officer in the war of 1813.¶ In the year 1855 Lieutenant Alden, United States Coast Survey, made an extensive survey of it, which is published in the Coast Survey Report of 1856.

* Vancouver, vol. 1, p. 243.

† Vancouver, vol. 1, p. 238.

‡ Wilkes.

¶ Verbal information.

"Suquamish Harbor" is a bay opposite Port Gamble, on the western shore of Hood's Canal. It has a triangular shape, and a long island lies before it. The name "Suquamish," also given to the above named point, is derived from an Indian tribe of this name, often mentioned in this region.

"Nickolowan Point" is the southern extremity of a long peninsula which separates Hood's Canal from Dahap Inlet. It was reached by Vancouver on the 11th of May, 1792, and named "Hazel Point," in consequence of its producing many of those trees.* Wilkes named this cape "Yakutska Point."† Its present Indian name was probably introduced by the Hudson Bay Company.

"Dahap Inlet" is the largest and broadest branch of Hood's Canal. It branches off from it to west of Nickolowan Point, and runs ten miles to the north towards Port Discovery. Vancouver explored it on the 11th of May, 1792. Though small, it has the extraordinary depth of from 60 to 70 fathoms nearly to its northern end. A northwestern branch of it, not mentioned either by Vancouver or by Wilkes, was discovered in modern times, and called "Colicee Inlet."

"Treesald Cove" and "Seabock Harbor" are two small bays opposite each other, to the south of Dahap Inlet.

Vancouver went as far as this point, and sent from there his lieutenant, Johnstone, to the east to see whether Hood's Canal was there closed, or whether it continued still in that direction. Johnstone reported that the canal here ended in a cove. The eastern appendage of the canal, twelve miles in length, which in this manner escaped him, was discovered by Lieutenant Case, of the United States Exploring Expedition, who found that it was separated from Puget Sound by an isthmus only $2\frac{1}{2}$ miles broad, and who also discovered on this isthmus a small lake called "*Kellum's lake*."

THE MAIN BODY OF ADMIRALTY INLET.

The main body of Admiralty Inlet branches off from the entrance basin at Suquamish Point. It runs at first through a more narrow passage between that point and Ariel's Point to the southeast, and then widening, trends directly to the south.

Sending out different branches, particularly to the west, and embracing several small and large islands, it ends at Point Defiance, at the so-called "Narrows," which separates it from Puget Sound. It is about 46 miles broad, and 40 nautical miles long.

Vancouver entered these waters on the 19th of May, 1792, in his large vessel, the *Discovery*, and explored it in all its principal parts.

Wilkes, in 1841, again surveyed it, and discovered some bays and islands which had been overlooked by Vancouver, or to which he did not give true configuration.

"Usclesi Bay" is a wide, open bay, to the east of Suquamish Head, on the southwestern shore of Whidby's island. It is not indicated by Vancouver, and it received its present name, I believe, from Wilkes.

"Sachet Head" is the most southern headland of Whidby's island, so called from an important tribe of Indians, "The Sachet," which inhabited and possessed the whole of Whidby's island. Vancouver, though he of course saw it, has no name for it, either in his report or on his chart. Its Indian name was probably introduced by the Hudson Bay Company. East of this head Possession Sound branches out, which we will describe hereafter. "Point Edmund" is

* Vancouver, vol. 1, p. 239.

† Wilkes, vol. 4, p. 44.

a low and broad point, somewhat projecting from the eastern shore, south of the entrance of Possession Sound. This point was not named either by Vancouver or by Wilkes. The present name appears to be of modern origin.

"*Duwamish Bay.*"—From Point Edmund the eastern shore runs nine miles south, then forms a very pointed headland called *West Point*, from which it turns abruptly to the southeast, and forms "*Duwamish bay*," one of the principal and most useful harbors of the whole inlet. The bay is six nautical miles long, in a southeastern direction, and about two and a half miles broad. It branches off from Admiralty Inlet between West Point on the north and Point Roberts on the south. The greater part of it is very deep—80 to 30 fathoms—but the southeastern extremity of it is filled with broad sand-banks, probably carried into it by the "*Sonawamis river*," which empties into the back part of the bay through several arms.

The bay is slightly indicated on Vancouver's charts. He gave it very little attention, and did not name it.

Wilkes surveyed it for the first time, and named it Ellicott's bay, after one of his officers. It was again surveyed by the officers of the English Admiralty, and the Admiralty charts have for it the Indian name, *Sonawamis river*. This name is, on the United States Coast Survey charts, only given to the river. The bay was again surveyed by Lieutenant James Alden, of the Coast Survey. He calls it "*Duwamish bay*," which name has, however, long been in use on the spot itself. On the northwestern shore of the bay a little town or settlement has sprung up called "*Seattle*," and a little anchorage near it is named from it "*Seatile harbor*."

"*Commencement Bay.*"—The coast from Point Roberts runs for about fifteen nautical miles nearly directly to the south without making any well marked bay; then it turns to the southwest, and forms at last in $47^{\circ} 17'$ a deep and spacious inlet, called "*Commencement bay*." This bay has more or less a square form.

With a southwestern and southeastern angle, it spreads out into a valley which seems to come down and to open here from the Cascade mountain range, where a corresponding opening or indentation south of Mount Rainier is observed.

Vancouver, who entered this bay on the 26th of May, 1792, observed from afar that opening in the eastern range corresponding to the bay, and he therefore believed there might be a channel cutting through the mountain and having eastern communication. He was, however, soon undeceived in this, and reached the end of the bay, of which he gives a handsome view in his work.* He gave no other name to it than the south part of Admiralty Inlet.

Lieutenant Ringgold, sent out by Commander Wilkes in the ship Porpoise on a surveying expedition from Nisqually to the north, commenced his survey in this bay on the 15th of May, 1841, and he therefore called it "*Commencement bay*." The little river emptying into the eastern corner of the bay is called "*Puyallup river*," which is about sixty nautical miles long, and comes in a northwest direction from the Cascade mountains, where it rises on the western slope of Mount Rainier. The western shore of Admiralty Inlet is throughout formed by the eastern coast of what is here called *the Great Peninsular*. This is a large tract of country between Hood's Canal and Admiralty Inlet. It has, upon the whole, the configuration of a triangle, or a leaf attached to the continent without a stem.

"It is everywhere surrounded by water with the exception of one point, namely, at that narrow little isthmus upon which Kellum's lake is situated, and which we might call *Kellum's*

* See Vancouver, vol. 1, p. 268.

Lake isthmus." On this western shore of Admiralty Inlet, south of Suquamish Head, may be mentioned the following inlets, harbors, points, and islands:

Point-No-Point, five miles to the east-southeast of Suquamish Head. I believe it was so called by *Wilkes*.

"*Apple Cove*" is a very small bay seven miles to the south of Point-No-Point.

"*Port Madison*" is a pretty spacious harbor a few miles to the south of Apple Cove. This port appears to have been perfectly overlooked by Vancouver. Lieutenant Ringgold explored it, and probably gave to it its present name.

The port has in its inner corner an outlet or passage of about 200 yards wide which conducts to the interior parts of Port Orchard. "*Port Orchard*" is a very much secluded and interior basin to the southeast of Port Madison. It may be said to consist of a principal body and four or five branches running out from it in different directions like the legs of a spider.

The northeastern of these branches opens into Port Madison by a narrow channel called "*Agatha's Passage*."

The northwestern runs up a few miles into the interior of the country, and ends in a shallow and narrow bay.

The principal body of Port Orchard runs from north to south, and turning towards the southwest ends there, in the interior of the great peninsula, in a similar manner.

From its southern port still another branch runs to the northwest called "*Dye's Inlet*," which is the most western water of the principal body of Admiralty Inlet.

A fifth branch of Port Orchard runs out towards the southeast and opens into a *widely* open bay, in the midst of which lies the little "*Blake island*."

Even these secluded branches of Admiralty Inlet have still water deep enough for the largest class of vessels, and afford superb and well protected harbors. The only danger is a reef of rocks which is nearly in the middle of the southern entrance.*

Port Orchard was discovered and entered through the south entrance on the 24th of May, 1792, by Mr. Orchard, one of Vancouver's officers, when the ships of Vancouver had their central station for all their *Admiralty Inlet operations* at a point near the entrance. Mr. Orchard surveyed the whole in one day, and did not discover the northeastern outlet into Madison harbor or Agatha's Passage, and also not Dye's Inlet.

Mr. Ringgold, on his above mentioned northern survey from Nisqually, spent nine days in the survey of this port, (May, 1841,) and discovered what Vancouver had overlooked.

"Dye's Inlet" was named after one of the officers of Wilkes' exploring expedition.†

Bainbridge island is a large island to the east of Port Orchard, and cut off from the continent by the two above named outlets and exterior harbors of that basin.

On the east it is bounded by Admiralty Inlet. It is about 8 miles long from north to south, and 4 broad from east to west.

On the eastern side it has two little harbors, "Eagle harbor" and "Port Blakey." This latter one, north of Restoration Point, has been minutely surveyed by the United States Coast Survey, and the chart of it is contained in the Coast Survey Report of 1856.

Vancouver, who saw only the southern outlet of Port Orchard, did not recognize that it was an island, and represented it as a part of the continent.

Ringgold, by sailing through the narrow Agatha Passage, proved it to be an island, and it

* Wilkes.

† Verbal information.

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was named *Bainbridge island*, after Mr. Bainbridge, a United States naval officer, under the command of whom Wilkes had once served.

The southwestern extremity of the island is the best known point of it in the history of exploration. It rises abruptly in a low cliff about 12 feet from the water side. The surface presents a beautiful meadow covered with luxuriant herbage. Vancouver saw this point on the 19th of May, 1792, and called it at first "*Village Point*," because he found an Indian village on its western extremity. To the south of this point, and under the cover of it, he anchored for a longer period of time, and made it the central station and rendezvous of his boat expeditions for the exploration of all the waters of Admiralty Inlet. Afterwards he changed the name of Village Point, and called it finally "*Restoration Point*," "having celebrated that memorable event whilst at anchor under it."* This point I believe should receive again its old name in our marine charts.

"*Blake Island*."—This little island lies south of Point Restoration. Vancouver sailed around it but could not come to anchor there, because he found nowhere less than sixty fathoms within a cable's length of the shore.

He gave no name to it. It was named by Wilkes, I believe, in compliment to Captain Blake, United States navy.

"*Vashon's Island*" is an island similar in size and configuration to Bainbridge island. It is ten miles long from north to south, and four in width from west to east.

It is separated from the "great peninsula" by a channel somewhat similar to Port Orchard. This passage, as well as also the insularity of this island, was at once discovered by Vancouver from his station at Point Restoration. He sent his lieutenant, Puget,† through the said passage to the west of this island, which he called Vashon's island, after his friend, Captain Vashon, English navy.‡

By the officers of Wilkes' exploring expedition it was discovered that the southeastern portion of this island is only connected with it by a narrow sandy isthmus at low water, and separated at high water, and that it ought to be called an island of itself.

The name Maury island was given to it, after one of the officers of the exploring expedition.

"*Point Defiance*" and "*the Narrows*."—Point Defiance is the long, low extremity of a little peninsula of the most southern part of Admiralty Inlet. It marks the limits between this great inlet and Puget Sound, and these limits are further marked by a contracted passage near this point, called the "Narrows." Through these "Narrows" the tide runs with great velocity, causing many eddies and whirlpools, through which the vessels are carried with extraordinary rapidity.§

8. PUGET SOUND, 47° 12' NORTH LATITUDE, 122° 50' WEST LONGITUDE.

Puget Sound forms a most variegated compound of narrow inlets and sounds, interlinked among each other by passages and channels, and connected with Admiralty Inlet only by the above named "Narrows." A number of peninsulars and islands are cut out by those different water branches.

* See the proofs for all this in Vancouver, vol. 1, page 259, 260, 279. It is to be observed that the latitude which Vancouver gives in his report (page 279) to this point, 47° 30' N., does not agree either with our present latitude of the southeast point of Bainbridge island or with the latitude which Vancouver gives to it in his charts. Notwithstanding this, there is not the slightest doubt that his Restoration or Village Point is the point designated by me.

† Vancouver, vol. 1, p. 260.

‡ Vancouver, vol. 1, p. 275.

§ Wilkes, vol. IV, p. 304.

The broadest and longest division of those waters is that into which Nisqually river empties from the south, and which follows from these two directions for long distances—one to the northwest, and one to the northeast. These two broadest and longest branches of the whole cluster, which form an angle before the mouth of Nisqually river, are considered to be the main body of the whole, and are usually called Puget Sound, *par excellence*, whilst the shorter and minor branches have their own proper names.

The eastern branch of this, Puget Sound proper, has towards the southeast, from Point Defiance to Nisqually river, (fifteen miles distance,) a very straight line shore.

On this southeastern shore lies, however, one remarkable bay or harbor, "Steilacoom harbor," called so from the little Steilacoom river, which empties into it. In late years the flourishing town Steilacoom has sprung up on the shore of this harbor. The harbor was minutely surveyed (1855) by the United States Coast Survey officers.

Their chart is contained in the Coast Survey Report of 1856; but the northwestern shore is cut up into three large islands:

"Rosario island," "Duntzte island," "Fisgard island," by three channels of which the central and broadest is called Bruce channel.

"Bruce channel" turns afterwards to the north and ends in a broad sound, which is called "*Carr's Inlet*," and loses itself in the interior of the *Great Peninsula*.

The second or northwestern main branch of Puget Sound runs from the mouth of Nisqually river in a straight direction for about twenty miles N. NW., and at last ends in a closed narrow inlet, called Case Inlet.

The eastern shore of this northwest main branch is without any well defined bay or side branch. Between it and Carr's Inlet a long peninsula is cut out which ought to have a name.

On the western side of this second main branch two narrow and long passages run out, which conduct to a complex system of western branches and inlets.

The southern of these two passages is named "*Dana's Passage*."

Between these two passages lies the great "*Hartstene island*," to the west of which they unite again.

From the waters behind (to the west of Hartstene island) branch out four narrow and long inlets, to the west "*Hammersly Inlet*," to the W.SW. "*Totten Inlet*," to the SW. "*Eld Inlet*," to the south "*Budd Inlet*." All these inlets—each about eight nautical miles long and one-half to one mile broad—and likewise the long, narrow peninsula between them trend to one central point, in which they are united like the roots of a tree.

The southern extremity of Budd's Inlet constitute the most southern waters of Admiralty Inlet.

Vancouver despatched, on the 19th of May, 1792, from his central station at Restoration Point, his lieutenant, Peter Puget, through the channel west of Vashon's island, who passed through the Narrows, which Vancouver named, after the discoverer, "*Puget Sound*."

Puget, in company with Whidby, surveyed, in boats, nearly all the intricate passages of this sound during a fortnight, from the 19th to the 27th of May.

These officers remaining out longer than was expected, Vancouver himself followed in boats, taking, however, the eastern and southern shores, because he thought they might have confined themselves to the western and northern shores.

Vancouver, in this boat expedition, reached, on the 28th of May, the southernmost point of

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Stanley, from Sketch by Dr. Cooper.

MOUNT RAINIER VIEWED FROM NEAR STEILACOOM.

J. Bien N.Y. lith.

our present Budd's inlet, which we mark still on our present charts with "*Vancouver's farthest*," and where, in late years, the promising town of Olmypia has sprung up.

From here Vancouver returned to the north, to his central station at Restoration Point, thinking that Puget would have done the rest. Many parts of Puget Sound were in this manner doubly surveyed by Puget and by Vancouver himself.

Wilkes gave names to all the inlets of this sound which, in Vancouver's report, had not been named. Nearly all the names which he gave them were in compliment to the officers of the squadron, as "Budd's inlet," "Eld's inlet," "Totten's inlet," "Case's inlet," "Hartstene's inlet," "Pickering Passage," "Peal Passage," "Dana's Passage," "Carr's inlet," &c. Some of the names also were given in compliment to the officers of the Hudson Bay Company, as, for instance, "Anderson island," "McNeil island," "Ketron island."

These names of the American Exploring Expedition, for the greater part, have been adopted by the Coast Survey, but it is very likely that all these inlets, islands, and points, had other local names given to them by the Hudson Bay Company, who have had, since 1830, a fort or settlement in the very centre of them, at the mouth of Nisqually river, and who were perfectly familiar with them.

The whole of Puget Sound was surveyed again in later years by R. M. Inskip.

A comparison of the charts of Wilkes and Inskip gives, with respect to names, the following result: The Anderson island of Wilkes is called by Inskip "Fisgard island;" McNeil island, "Duntze island;" Ketron island, "Kittson island;" Fox island, "Rosario island;" Drayton pass, "Crawford channel;" Park pass, "Moore bluff."

Inskip has added the following names: "Thompson cove" and "Rodd bay" for little harbors on Fisgard island; "Ryder channel" and "Bruce channel" for passages between the islands; "Scarboro' shoals" for certain shoals to the south of Fox island; "Heath bay" for a cove to the northeast of Kittson or Ketron island; "Gordon Point" for a cape in the same locality. Some of Inskip's names have been preferred on our Coast Survey charts to those of Wilkes.

"*Nisqually river*" is the most important river which enters Puget Sound. It is about sixty miles long, and comes in a northwestern direction from the Cascade mountains, where it rises between Mount Rainier and Mount St. Helens. It runs perfectly parallel with Puyallup river, which empties into Commencement bay, and is in size and every other respect similar to this. Its name was introduced into geography by the Hudson Bay Company, who have had, since 1830, a fort at its mouth called, "Fort Nisqually." At the mouth of the river lies a bank called on Wilkes' chart "Mud flat," and in Inskip's "Inskip bank."

In the English parliamentary documents on the subject of Vancouver Island the name of the river and the fort are usually written "*Nasqually*."

Mount Rainier is one of the highest and most prominent peaks of the Cascade range. It has an altitude of $12^{\circ} 33'$.^{*} It stands in about $46^{\circ} 40'$ north latitude, and $121^{\circ} 27'$ west longitude, and seems to form the southern pillar and landmark of a large section of the Cascade range, which begins in the north with Mount Baker and branches out from this knot in several branches.

The main range makes here an angle and turns to the southwest to Mount St. Helens. It stands at a distance of about fifty miles from the southern parts of Admiralty land and Puget's Sound; but it is visible from all parts of these waters, and may be said to be their landmark for taking bearings.

^{*} After Wilkes.

The mountain was first discovered by Vancouver in the beginning of May, (about the 7th,) of 1792, from Port Townshend. He named it, in honor of his friend, Rear Admiral Rainier,* Possession sound and

WHIDBY'S ISLAND, FROM 47° 08' TO 48° 26' NORTH LATITUDE, 122° 35' WEST LONGITUDE,

Possession Sound and the waters which form its continuation constitute quite a separate part of Admiralty Inlet, or rather an intermediate section of water between Admiralty Inlet and Rosario Strait. These waters begin in the north in Deception Passage, and stretch down from there nearly forty miles in a north and south direction, which seems to be a straight continuation of the main body of Admiralty Inlet. They are to the west separated from De Fuca strait and Admiralty Entrance by Whidby's island.

"*Whidby's island*" is the largest island of this whole region. It is about 30 nautical miles from north to south, and about two to five miles broad from west to east. It has a very irregular form, two broad ends and a very narrow main body. It is separated on the north by Deception Passage from Fidalgo island; on the west it faces De Fuca strait, of which it forms the eastern shore, and to the west-southwest it forms the eastern shore of Admiralty Entrance; to the east it forms the western shore of Possession Sound and Port Gardner, and has here various headlands and inlets.

The island is occupied by a numerous tribe of Indians, "the Satchets," who have many villages in it. It presents in many parts a delightful prospect, spacious meadows, beautiful pastures adorned with clumps of trees, principally oak. The island was, of course, first seen by the Spaniards Quimper and Elisa, but was not recognized as an island.

Vancouver's officer Whidby explored all the surrounding waters of the island, and by circumnavigating it proved it to be an island, (May and June, 1792.) Vancouver, therefore, called it after him. It has ever since retained his name.

The waters to the east of Whidby island, for which, as forming an independent section, we ought to have a general name, and which I may designate with the name given to an essential part of them, "Possession Sound," branch out in their central part into two principal branches, of which the western is called "*Port Gardner*" and the eastern "*Port Susan*." These two branches surround a large island called "*Caamano island*." They show, consequently, the greatest expansion in their central parts. They contract as well to the north as to the south, and have communication with other channels, by Deception Passage with the northern, by the more particularly so called Possession Sound with the southern waters.

The Spaniards appear never to have entered these waters, though they observed the northern entrance to them. Vancouver sent out for their exploration from his central station in Admiralty Inlet at Restoration Point.

Lieutenant Broughton, in the vessel *Chatham*, and Mr. Whidby, in a boat, both sailed from there on the 28th of May, 1792,† and entered Possession Sound on the same day. Broughton, in the *Chatham*, surveyed the eastern side of the entrance and Gedney's island,‡ and Whidby, in his launch, explored as well Port Susan, which he thought to be closed, as Port Gardner and Penn's cove, and he proceeded as far north as Deception Passage, which he believed to be "not navigable for vessels of any burden, in consequence of the rocks and overfalls, and of a very irregular and disagreeable tide."§

* Vancouver, vol. I, p. 235.

† Vancouver, vol. I, pp. 267 and 275.

‡ Idem, p. 280.

§ Idem, vol. I, p. 287.

He returned from there to the south to the entrance of Possession Sound, where he found Broughton, in the Chatham, and also Vancouver, in the Discovery, who, in the mean while, had followed his officers.

On this the whole exploring expedition left Possession Sound on the 5th of June, and leaving Admiralty Sound sailed to other regions.

The movements of Wilkes, in 1841, were similar to those of Vancouver. He sent his second ship, the Porpoise, under Lieutenant Ringgold, to Possession Sound. Ringgold surveyed the same ground which had been explored by Broughton and Whidby, but completed, in some respects, their discoveries.

In later years these waters have been explored by the Hudson Bay Company, and by the officers of the United States Coast Survey.

The several parts of which they are composed are the following:

"*Possession Sound*" proper runs up from Admiralty Sound to the north, and conducts to the interior parts of these waters. It is at first only two miles broad, but ends in a basin which is nearly five miles in width. In the midst of the northern part lies a little island, "*Gedney's Island*," and towards the east the sound has a prolongation into which the river "*Snaquamie*" empties. Possession Sound may be said to terminate in the north at Point Alan, where it separates into two other branches. The sound received its name by Vancouver, from the circumstance that he, on the 4th of June, the anniversary of the King of England's birth, here took formal possession of all the regions around De Fuca Strait and Admiralty Inlet, and distributed, at the same time, different geographical names.*

"*Gedney's Island*" is a small island, five miles in circumference, in the centre of the northern part of Possession Sound proper. It was left nameless by Vancouver, and Wilkes gave to it the name of one of his friends, Mr. Gedney.†

"*Port Susan*" is a long basin which branches out from the eastern part of Possession Sound to the north-northwest. It is about ten miles long, and from three to four miles broad. It has a depth of from forty to fifty fathoms in mid-channel, which, however, decreases in the northern part. It was first explored by Whidby, Broughton, and Vancouver, thought to be perfectly closed, and called "*Port Susan*."‡

Wilkes represents it in his charts as closed. In later years only that channel has been discovered which conducts out from it to the north, into the waters north of Caamano island. On the eastern shore of the port, near its southern entrance, lies the broad mouth of a little river called "*Sinahomis river*."

"*Caamano Island*" is an island fifteen miles long from north to south, with a broad northern head and a very narrow southern extremity, between Port Gardner and Port Susan. Though Wilkes represented this island in his charts as connected with the continent, still he must have had some suspicion about its insular character, for he called it "*McDonough's island*," after Mr. McDonough, United States navy, who commanded, 1812, in Lake Champlain, and gained there a victory over the English.

On the English Admiralty charts, the island is called "*Caamano island*," probably in remembrance of the Spanish name, "*Bocas de Caamano*," given by Elisa to Admiralty Entrance.

This name seems to have prevailed and to have been adopted in all our modern charts, probably because the British officers have essentially proved the insularity of the country.

* Vancouver, vol. I, p. 289. He does not exactly state the locality of this ceremony.

† Verbal information.

‡ Vancouver, vol. I, p. 289, does not say why he called it so.

"*Point Alan*" is the southern extremity of Caamano island. It is the only point of the island to which Vancouver gave a name. He called it so, probably, after one of the lords of the admiralty, the Vice-Admiral Sir Alan Gardner.

"*Port Gardner*" is the principal channel branching from Possession Sound proper towards the northwest. It is about twenty nautical miles long, and two to three miles broad, between Whidby's island on the west and Caamano island on the east. It was called by Vancouver Port Gardner in compliment to the Vice-Admiral Sir Alan Gardner, under the command of whom Vancouver formerly served.

Wilkes, in 1841, called it "*Saratoga Passage*," after the *Saratoga*, which Mr. McDonough, United States navy, commanded, 1812, on Lake Champlain.

But it appears that on our maps the old name of the first English discoverer prevails over the new one.

From the southwestern part of this bay, a long narrow inlet runs out to the south, cutting into Whidby's island.

To this inlet Wilkes gave the name "*Holmes' Bay*," a surgeon of the *Porpoise*, who died when the chart was constructing.*

Another little bay of this port was called by Wilkes "*Duncan's Bay*," from Mr. Duncan, an officer of the ship *Saratoga*, commanded by McDonough, in honor of whom the neighboring island and the whole passage was called.

"*Penn's Cove*" is a spacious bay to the northeast of Port Gardner re-entering into Whidby's island. It was first surveyed by Vancouver's officer, Mr. Whidby, and Vancouver gave to it the name "in honor of a particular friend of his, Mr. Penn."† It was again surveyed (1841) by Wilkes, who named different points in it "*Middle Point*," "*Point Williams*," &c.

"*Deception Passage*" is a narrow and intricate channel by which the waters of Possession Sound and Port Gardner communicate towards the northwest with De Fuca and Rosario straits. It is three miles long from east to west, and in parts only some one hundred yards broad between Fidalgo and Whidby islands. It abounds with rock above and beneath the surface of the water. Before its western mouth lies a little island called "*Deception island*."

The entrance to this passage was first seen from the western side from De Fuca strait by the Spanish explorers, Quimper and Elisa, and called by them "*Boca de Flow*." They, however, did not enter it. It was first explored and recognized as a passage by Vancouver's officer, Whidby. He thought it to be impassable for large vessels, and probably from this circumstance Vancouver called it Deception Passage. But Mr. Ringgold, in the ship *Porpoise*, 1841, sailed through it, and proved it to be also passable for large vessels. There exists still, besides Deception Passage, another water branch leading out from the interior waters of Port Gardner and Possession Sound, and connecting them with northern waters, Padilla and Bellingham bay. This passage, nameless on our charts, is long, very tortuous, very narrow, and so extremely shallow that it can only be used at high tide by boats. It separates, to a certain degree, Fidalgo island from the continent. Lieutenant Ringgold discovered and explored this passage, which the Indians had pointed out to him.‡

GENERAL VIEW OF THE HARO ARCHIPELAGO AND APPROACHES, BETWEEN 48° 26' AND 48° 46' NORTH LATITUDE, AND 122° 45', 123° 14' WEST LONGITUDE.

Between the southeastern part of Vancouver's island on the west and the continental part of Washington Territory on the east lie numerous large and small islands which separate the

* Verbal information.

† Vancouver, vol. I, page 287.

‡ Wilkes' E. E., vol. IV, page 482.

eastern part of De Fuca's strait from the southern part of the Gulf of Georgia, several straits and passages cut through these islands from the south to the north connecting the two great waters.

The two broadest, most navigable, and important of these straits are the *Canal de Haro* on the west and the *Rosario strait* on the east.

The principal direction of De Haro Canal is at first from De Fuca strait toward the N.NW.; then it turns in a semi circle to the NE. and E. Rosario strait, *vice versa*, runs at first N.NE., then N., and at last it turns to the NW., describing a semicircle, and mixing its waters with those of Haro strait in the southern part of the Gulf of Georgia.

So these straits may be said to describe a circle, and to enclose between them a group of islands, which, upon the whole, constitute a circular archipelago. The greater number of these islands, and the largest of them, lie together in a somewhat compact group, but some of the smaller are detached from the main group. For the group itself we will adopt the name "San Juan," or "De Haro archipelago," the propriety of which name we will consider hereafter.

The three principal parts of this whole locality we will consider in the following order, from west to east: 1. *Canal De Haro*; 2. *The central group of islands*; 3. *Rosario strait*.

"*The Canal De Haro*" is a very broad and deep strait leading from De Fuca strait to the Gulf of Georgia. It begins to branch off at Gonzale Point, the southeast extremity of Vancouver Island, at first in a N.NW. direction, and then describes a circuit to the east, with a length of about thirty miles, and an average width of seven to eight miles.

In its southern part it has about the depth of De Fuca strait, from 60 to 100 and more fathoms, but in its northeastern half it shows the more moderate soundings of the southern part of the Gulf of Georgia, 30 to 40 fathoms, though occasionally here also very great depths occur.*

It is said that throughout the whole strait only one unseen and hidden danger exists, namely, a sunken rock, called "Unit Rock," east of Darcy island, in $48^{\circ} 34'$ north latitude.

The currents throughout the whole strait are very strong.

On the western side lie Vancouver Island and many smaller islands and peninsulas, between which the strait branches out into several harbors, bays, inlets, and long passages, which, however, belong to the British dominions.

The largest of the islands above mentioned is Saturna island, on the northwest, and the longest of those passages is that which branches out south and west of Saturna island, from the interior angle of Canal De Haro, towards the northwest, and forms a very interesting interior navigation along the coasts of Vancouver Island.

On the east the shores of De Haro strait are formed by the great central group of islands, principally by San Juan, Waldron, and Orcas islands.

Meares pretends that his mate, Duffin, whom he sent out into the interior of De Fuca strait, saw this strait, and he gives on his chart a faint indication of it, but it is very improbable that the said Duffin ever saw De Haro Canal. We are certain that the Canal, at its southern entrance, was first seen by Don Gonzalo Lopez de Haro, who explored De Fuca strait in 1789, and who returned home from this strait, which was at once called after him, *La Boca de Haro*, (the Mouth of Haro.)

It was again seen by Haro's successor, Don Manuel Quimper, (1790,) who says that he saw the

* See reconnaissance of Canal De Haro and Strait of Rosario, Coast Survey Report of 1854.

strait called "La Boca de Haro," stretching out far to the northwest and north, to the end of his horizon, but that he had not time to explore it.*

Don Francisco de Elisa was probably the first who sailed through the strait, (1791.) I cannot make it certain, but I believe that he entered into the Gulf of Georgia by Rosario strait, and returned from it by the Canal de Haro; at least, his chart is the first and oldest which has the principal features of the Canal.*

Vancouver sent out, on the 18th of May, 1792, his lieutenant, Broughton, in the ship Chatham, from the Fort Discovery, towards these regions. We cannot say whether Broughton, on this occasion, sailed through the strait, because Vancouver's report on this expedition is not explicit.

He has the principal features of the Canal on his chart, but he may have copied it from a Spanish chart, perhaps from that of Elisa, a copy of which he may have received at Nootka Sound.

This Canal was very much neglected by the old navigators, because they all sailed to the east, and passed through Rosario strait; so did Vancouver, Galiano, and Valdez. Their object was to lookout for a passage to the east, and to fix the continental shores. The geography of this Canal has been much more developed in modern times; but the history of this development belongs to the hydrographical history of Vancouver Island.

THE DE HARO ARCHIPELAGO.

The De Haro archipelago consists principally of three very large, four moderately large, and many smaller islands, which form a pretty compact group of a more or less circular outline, with some scattered islands round it, between Canal de Haro on the west, Rosario strait on the east, De Fuca strait on the south, and the Gulf of Georgia on the north. The whole has a circuit of 60 or 80 nautical miles.

One broad strait, called "Washington Sound," cuts right through it from De Fuca strait to the Canal de Haro in a N.NW. direction, and sends out from its central parts another principal branch towards Rosario strait in an E.NE. direction. In this manner three detached pieces of land are formed, San Juan island, Orcas island, and Lopez island. The interior straits of this archipelago have, however, much smaller dimensions than those which surround the entire group, De Haro and Rosario straits.

All the islands which compose this archipelago present throughout the same geological features. Sandstone and conglomerate prevail. On some islands are indications of coal. They have a shallow and poor soil, and are very dry in summer. They are of a moderate elevation, and covered with a thick growth of Oregon pine; other kinds of wood are rare. The highest mountains found on them are about 1,000 feet high, with the only exception of Mount Constitution, on Orcas island, which has an altitude of more than 2,000 feet. They all abound in deer, and elk in great numbers are found on Orcas island.

The sea otter appears never to have lived among these islands. Lopez de Haro was the first who saw from a distance this archipelago, when he arrived (1789) at the entrance of the canal named after him; and probably, therefore, the name "De Haro archipelago" has been proposed.

Elisa (1791) was the first who circumnavigated the whole group, entering the Gulf of Georgia by Rosario strait, and returning to De Fuca strait by the De Haro Canal.

Elisa did not enter, however, the intricate and tortuous channels of the group, and, thinking

* A most interesting and large Spanish copy of Elisa's chart, made in Mexico, is preserved in the archives of the Topographical Bureau in Washington. Quimper's manuscript journal is in the library of the State Department at Washington.

that the whole was one island, he called it "*Isla de San Juan*," (St. John's island.) Under this name we find it on his chart, and also on those of the Sutil and Mexicana, (1802.)

Vancouver first had a view of this archipelago from the high east end of Protection island, (on the 18th of May, 1792,) and recognized from afar that it appeared to be "an archipelago of islands of various sizes."*

He sent out on the same day his lieutenant, Broughton, in the Chatham, to explore it,† and from this exploration Broughton returned on the 25th of May. But Vancouver gives us only two words‡ on this interesting expedition, and we are therefore unable to say which way Broughton went and what he explored. Vancouver has, however, on his chart all the principal features of the archipelago, the outline and configurations of its largest islands and channels, which he probably obtained from Broughton's survey and chart. But the whole group, as well as its component parts, are without names.

The sea otter never having been found among these islands, the fur traders took no notice of them, but, passing by them, left them unexplored.

Captain Belcher, in the year 1840, made an accurate survey of these regions.

Wilkes, in the year 1841, fitted out a large boat expedition to complete the survey of this archipelago and of De Haro strait. He set out for this purpose, with seven boats, on the 25th of July from New Dungeness; and though he could devote to this labyrinth only a few days, (until the 28th of July,) because he was soon called back to the Columbia river by the bad news of the disaster and shipwreck of his vessel, the Peacock, still, by the strenuous exertions of both officers and men, he finished at least the survey of the Canal de Haro, and of a part of the archipelago.§

Wilkes at first intended to give to this archipelago the name of "*Navy archipelago*," in honor of the United States naval officers who surveyed it, and whose names he had given to different islands of the group, but he afterwards decided in favor of the name De Haro archipelago, in honor of the first discoverer.||

The triangulation and other operations of the United States Coast Survey have now been extended over this archipelago. The different islands, straits, and harbors of the group we will name from east to west:

"*San Juan island*" is probably the largest of all the islands of this archipelago. It has the form of a half moon, curved toward the southwest to De Haro canal, and is about twelve miles long from southeast to northwest. In the middle of its southwest shore a mountain rises of about one thousand feet elevation.

It was this part of the archipelago which was first seen and to which the Spanish name San Juan, which comprised the whole, was first attached. It seems, therefore, just that this old name should be retained principally for this island. Wilkes called it "*Rodgers island*," in honor of Commodore Rodgers, for some time the head of the United States navy. Other charts have the name "*Bellevue island*," but the English Admiralty charts preserve the old name "*San Juan*," which is also adopted in the United States Coast Survey charts. To the northwest of it lie several other smaller islands which appear to be a continuation of it.

"*HENRY ISLAND*," which is separated from it only by a narrow channel, with the little islets of "*Pearl island*" and "*MORSE'S ISLAND*." "*SPIEDEN'S ISLAND*," so named by Wilkes after Mr. Spieden, the purser of his ship, Peacock, with the small islet "*Sentinel R.*" and "*Stuart*

* Vancouver, vol. I, page 244.

† Vancouver, vol. I, page 258.

‡ Vancouver, vol. I, page 267.

§ Wilkes' Exploring Expedition, vol. IV, page 484.

|| Verbal information.

island," so named by Wilkes after Mr. Stuart, his clerk. It has on its northern coast a little bay, which is extremely well protected by another little island before it and offers an excellent anchorage.

"ORCAS ISLAND."—This island is quite as large as San Juan island, if not larger. It is the northern island of the archipelago and has a length from east to west of twelve miles. Its northern shore has the form of a semicircle. Towards the south it runs out into three broad peninsulas, separated by two inlets. The eastern peninsula has the highest mountain of the whole archipelago, "Mount Constitution," (two thousand three hundred and ninety-seven feet high,) so called by Wilkes. Wilkes gave to this island the name of "*Hull's island*," in honor of Commodore Isaac Hull, United States navy, who captured the English vessel *Guerriere*, in the year 1813-'14. The present name, "Orcas island," comes perhaps from Scotland, and is originally to be found on the English Admiralty charts, (of 1847.) Wilkes named the large inlet in the south of the island "*Guerriere bay*," after the above mentioned vessel, and "*Ironsides inlet*," after the nickname of the American ship "Constitution," which Hull commanded. The name of this ship was given by Wilkes to the above mentioned "Mount Constitution."

The northern headland of this island is called "Point Thompson," and the eastern "Point Lawrence." The small islands which lie around Orcas island from the east to the north and west are the following: The three Wasp islets, "Jones island," so named by Wilkes after Captain Jones, United States navy, and "Flat Top island."

"*Waldron island*."—This little island appears distinctly on the old Spanish surveys and on Vancouver's. Wilkes gave to it the name which it bears, after Mr. John Waldron, who was the purser of the ship *Vincennes*, of the exploring expedition. The northeastern cape of this island is called "Point Hammond," and the southwestern "Point Disney." "*Skip Tack*" and "*Freemann's island*" are small islets to the north and east of Waldron.

"*Sucia Group*" is a very irregularly shaped island, exactly to the north of Orcas, with half a dozen islets, rocks, and reefs near it. The name is probably of Spanish origin; "*Sucio*" means, in Spanish, "nasty," "dirty," and in the nautical language, "foul," "unclean." "Isla Sucia," means an island with an unclean, dangerous, reefy shore. Wilkes called the island the "*Percival Group*," after Captain Percival, United States navy. The English Admiralty charts have the old Spanish name "*Sucia*," which seems also to be adopted by the Coast Survey charts.

"*Patos island*" is a small island to the northwest of "Sucia." Its Spanish name, which signifies "*Duck island*," was changed by Wilkes to "*Gourd island*," and is re-established again by Admiralty and Coast Survey charts.

"*Matia Group*" are two little islands to the east-southeast of Sucia; Wilkes called them "*the Edmund's Group*," but the English Admiralty and Coast Survey charts have "*Matia Group*." Mr. G. Davidson, of the Coast Survey, who surveyed (1853) this little group, the Sucia group, Patos island, and Waldron island, has materially changed the configuration given to those islands on former surveys; and he has, at the same time, proved the non-existence of the Little Adolpines and Garden islands, which Wilkes and other charts put to the south of the Percival group.

"*Barnes' island*," "*Clark's island*," and "*the Sisters*," form a little group to the north of Point Lawrence, the easternmost cape of Orcas, and "*Peapod Knol*" to the south of it. "*Lopez island*" is the third of the great islands of De Haro archipelago.

It is the extreme southeastern island of the group. It has a length of ten miles from north to south, and marks with its southeastern extremity, called *Colville Point*, the entrance of Rosario strait.

In the history of exploration this point is further memorable, because the officers of the Spanish Exploring Expedition, of the *Sutil* and *Mexicana*, anchored at this point on the 10th of June, and made here an observation of an emersion of the first satellite of Jupiter.*

The name of this island is probably of Spanish origin, and perhaps it is to be derived from the first discoverer of this archipelago, "Lopez Gonzales de Haro." Wilkes called it "*Chauncy's island*," after Captain Chauncy, of the U. S. N., but the old name, "Lopez," has been restored on the Admiralty and Coast Survey charts. The southeastern part of this island forms nearly an island of itself. From this peninsula a chain of islands runs out directly to the north, connecting Lopez and Orcas, and constituting the western shore of Rosario strait. The first of them on the south is "*Decatur's island*," so called by Wilkes after the celebrated Captain Decatur. Five or six little islets lie round it, among them "*James island*," to the east, towards Rosario strait.

"*Blakely island*" is to the north of the former, and was called by Wilkes after Captain Blakely, U. S. N., after whom a little harbor had already been called on Bainbridge island. Between it and Lopez island lies the little "*Foost island*," so named by Wilkes after his friend Mr. Foost.

North of Blakely island, in the channel, between it and Orcas, lies "*Obstruction island*."

"*Shaw's island*" has a central position in the whole archipelago, and is separated by three channels from the three great islands, Orcas, Lopez, and San Juan. It was named by Wilkes after Captain Shaw, U. S. N. It has no name on the English Admiralty charts of 1847.

The small channels also which separate the islands of the archipelago received names from Wilkes, like those of the islands, commemorating names of the United States navy and naval events.

For instance, "*Ontario Roads*," the passage along Lopez or Chauncy island to the east, so called because Captain Chauncy had commanded on Lake Ontario.

"*Frolic strait*," between Shaw's and Chauncy islands, after the English vessel "the Frolic," captured by Captain Jones.

"*Macedonian Crescent*" after an English vessel, "the Macedonian."

These names are not all retained on the English Admiralty and Coast Survey charts.

ROSARIO STRAIT.

"*Rosario strait*" is, after Canal de Haro, the longest, broadest, and deepest channel between De Fuca strait and the Gulf of Georgia; but, for discovery and navigation, it has always been the very first and the most used of all the straits, which preference it owes to its geographical position. Vessels which enter De Fuca's strait and proceed to the west find some difficulty in sailing round the pointed extremity of Vancouver's Island, and turning into the abruptly changing direction of De Haro Canal, whilst Rosario strait, into which De Fuca's strait tends by degrees to the northeast and north, receives them easily, and admits them with the same winds with which they sailed through De Fuca's straits; for the Rosario strait is the direct prolongation of the navigation of Admiralty Inlet, and vessels which proceed from there to the Gulf of Georgia will naturally prefer the passage through it to the passage through De Haro

* See, upon this event, the Journal of the *Sutil* and *Mexicana*, p. 43.

Canal. Rosario strait has here about the same position and value with respect to De Haro Canal, as, in a similar European archipelago, (that of the Danish islands,) the "Sound" has to the so-called "Little and Great Belt."

Rosario strait begins in the south, between "*Colville Point*" (east extremity of Lopez island) and Deception Passage, and runs directly north, about twenty nautical miles, where it ends between Point Thompson (north extremity of Orcas island) and the northern point of Lummi island. It has throughout a smaller depth than De Haro Canal, generally 30 to 50 fathoms, and at a few places 60.

Its currents are not quite so strong as those of Canal de Haro. Its western shore is formed by the chain of islands named Lopez, Decatur, Blakely, Obstruction, and Orcas. Its eastern shore is formed by another chain of islands, of which we will speak presently. This canal was for the first time passed (1791) by Don Francisco Elisa, and called *Canal de Fidalgo*, (Fidalgo's Canal,) in honor of a well-known Spanish officer of that time.

Vancouver, who passed it after Elisa, (1792,) gave no particular name to it, either in his report or in his charts. The passage retained the name Canal de Fidalgo on the Spanish Admiralty charts. Wilkes named it "*Ringgold's channel*," in honor of Lieutenant Ringgold, who surveyed it on his passage from Admiralty Inlet to the Gulf of Georgia. On the English Admiralty charts, after Kellet, (1847,) it is called "*Rosario strait*," which name was first given by the Spaniards to the Gulf of Georgia, and is now confined to this small strait. Very probably the name was applied to this strait by the Hudson Bay Company, perhaps by Dr. MacLaughlin. It appears now to have been generally adopted. The Coast islands, and waters between Deception Passage and the British American boundary line, between $48^{\circ} 32'$ and 49° north latitude.

From Deception Passage the general trending of the coast is from S.S.E. towards the N.N.W. But there are many irregular deviations from this direction, caused by many small and large islands, bays, and peninsulas. Neither the islands nor the coast itself are very elevated, and the elevation diminishes towards the north. Towards the mouth of Frazer's river the country presents a flat, low, and sandy delta.

It is the lowest land connected with the western base of the Cascade range.

This whole section may be subdivided into—

First. The islands and bays along Rosario strait.

Second. The bays and peninsulas along the Gulf of Georgia.

1st. "*Fidalgo island*" is the first island on the north of Deception Passage. It has Padilla bay on the north and Rosario strait on the west, and on the east it is separated from the continent by that narrow and shallow channel discovered by Ringgold. In its outlines it is somewhat like Orcas and Whidby islands. On its western part is situated Mount Erie, of an elevation of about 1,250 feet.

Several deep bays cut into it on different sides, and corresponding peninsulas project out from it, which are as yet nameless on our charts.

The Spaniards and Vancouver, who thought it to be a part of the continent, had no particular name for it. Wilkes gave it the name *Perry's island*, in honor of Commodore Perry, United States navy, the hero of Lake Erie. In allusion to this, also, the highest mountain of the island was named "*Mount Erie*."

On the English Admiralty charts it is called "*Fidalgo island*," probably with the intention of preserving that old name which was given by the Spaniards to what we now call Rosario strait. This latter name appears to have prevailed.

2. "*Burrow's and Allan islands.*"—These are two small islands which lie in a bay of Fidalgo island, to the west of it. These two islands are called, in the Voyago of the Sutil and Mexicana, "*Las dos Islas Morros,*"* (the two Rock islands.) Burrow's island is the larger, and was called after Captain Burrow, United States navy, who lost his life on board the ship Boxer.†

Allan island was called after Captain Allan, United States navy, who lost his life on board the American ship "*The Argus.*" After this ship, the bay itself was named by Wilkes "*Argus bay.*" Quite near to these are a few islets and rocks, as "*Young island,*" "*Dun's rock,*" and "*Williamson's rock.*"

3. "*Padilla bay*" is a pretty large basin, surrounded on the south and east by Fidalgo island and the continental shore, separated on the north from Bellingham bay by the long, sandy peninsula of Wilson Point, and covered on the west by Guemes island. To the south of this island the bay is connected with Rosaria strait by a narrow channel, and to the northeast of that island by a broad outlet. In the middle parts of the bay lie several small islets.

The bay probably received its name, "*Seno de Padilla,*" from Elisa, (1791.) Padilla was one of the titles of the then reigning viceroy of Mexico, Count Revilla Gigedo y Padilla. Vancouver, through his officer, Whidby, entered the bay, gave no particular name to it, and this was probably the reason why the old Spanish name was continued.

4. "*Guemes island,*" ($48^{\circ} 34'$ north latitude, $122^{\circ} 37'$ west longitude) is an island of a triangular shape, to the west of Padilla bay, and separated from Cypress island by Bellingham channel. Some smaller islets lie round it, among them "*Sack's island,*" to the northeast. The island received its name from the discoverer, Elisa, probably after the then viceroy of Mexico, Count of Revilla Gigedo, whose family name was "*Guemes.*" A town had already been founded on the shores of the Gulf of Mexico in 1745, and named, in honor of another viceroy of the same family, Don Juan Francisco Guemes, Count of Revilla Gigedo. There is also a little Port Guemes on the north side of Vancouver's Island. Vancouver has no name for this island, and probably from this circumstance the old Spanish name was continued.

Wilkes called the island "*Lawrence island,*" in honor of Captain Lawrence, United States navy, who commanded the *Hornet*, and captured the English vessel "*Penguin.*" After this English ship Wilkes called a bay on the east side of the island "*Penguin bay,*" and he gave the name of the American vessel to the narrow passage which separates Fidalgo island from Guemes island, and which he named *Hornet's harbor.*

5. "*Cypress island*" ($48^{\circ} 36'$ north latitude, $122^{\circ} 43'$ west longitude) lies to the west of Guemes, and is of an equal size. Like all these islands, it is pretty well wooded; is composed of high, rocky mountains and steep perpendicular cliffs,‡ and has, in the centre, "*Lake Mountain,*" of 1,525 feet elevation. At a small distance from the north point of the island lies "*Rock island;*" to the east the "*Cone islands;*" to the west, in a large bay, "*Strawberry island;*" and the southern point of *Cypress island* is surrounded by a number of rocks.

On the Spanish charts I find no name for this island. Broughton saw this island on his preliminary reconnaissance of these regions, and discovered, on its southwestern side, a bay, which he called "*Strawberry bay.*"§ Vancouver anchored in this bay on the 6th of June, 1792, and adopted that name. The island itself was named by Vancouver "*Cypress island,*" from the abundance of Cypress which he found there.¶ Wilkes called that little islet in Strawberry

* Sutil and Mexicana, p. 45.

§ Vancouver, vol. I, p. 292.

† Verbal information.

|| Vancouver, p. 294.

‡ Vancouver.

bay, which Vancouver left nameless, "*Hautboy island*," from that kind of strawberries which is very common in North America, and usually called Hautboy in the United States.*

6. "*Bellingham channel*" ($48^{\circ} 35'$ north latitude, $122^{\circ} 40'$ west longitude) is a broad passage between Cypress and Guemes islands. It runs to the N.NE., and is the best passage from the southern part of Rosario strait to Bellingham bay in the east.

The Spaniard (Elisa) named it "*Canal de Guemus*," from the island to the south. Its present name is derived from its geographical position with respect to Bellingham bay.

7. "*Sinclair's bay*" ($38^{\circ} 37'$ north latitude, $122^{\circ} 41'$ west longitude) is a little island to the northeast of Cypress island. It has on the Spanish Admiralty charts (Madrid, 1795) the name "*Isla de Aguago*." Aguago was, like Padilla and Guemes, one of the titles of the viceroy of Mexico, Count Revilla Gigedo. It received its present name from Wilkes.

8. "*Vendovi island*" is a still smaller island to the west of Sinclair. It received its name by Wilkes, from the name of an Indian whom Wilkes brought on board his vessel from the Feejee (or Vite) island to these northern quarters. To the N.NW. of Vendovi lie the Vite Rocks, so named in connexion with the former named, from the home of the Indian Vendovi, the Vite islands.*

9. "*Bellingham bay*" ($48^{\circ} 40'$ north latitude, $122^{\circ} 33'$ west longitude) is the largest and most eastern bay to the east of Rosario straits. It may be considered to be the southeastern extremity of the Gulf of Georgia, and it therefore always attracted, in a high degree, the attention of early navigators, who searched in this bay for a further passage towards the east.

It has an oval shape and a length of about 16 nautical miles from N.NW. to S.SE.; it is for the greater part surrounded by the continental shore, and half closed to the west by the peninsula of William Point on the south, and the peninsula of Point Francis on the north.

Between these two points lie the southern part of Lummi island, Elisa's island, Vendovi island, which further help to close the bay. The bay may be said to have two wings or subdivisions—one to the southern of Point William, which is, par excellence, called Bellingham bay, and one to the northeast of Point Francis, which has on our charts the name Gaston bay. The bay seems to be the most shallow of all the waters of this region; the deepest soundings at the entrance are from 20 to 30 fathoms, and from there they seem to decrease regularly to the east, south, and north, to 10, 5, 3, and 1 fathom. The shallowness of the bay corresponds to the lowness of the country round it, which is partly even swampy and marshy.† Into the north part of the bay empties a pretty large river, and to the east of the bay lies a large interior lagoon.

Elisa (1791) was the first who entered this bay and called it "*Seno de Gaston*" (Gaston's Gulf.)‡

It was again entered, after him, by Vancouver's officer, Mr. Whidby. In a boat expedition from Birch bay, on June 11, 1792, he surveyed it thoroughly, and Vancouver gave it the name Bellingham's bay—he does not say why. The bay was entered again, a day or two after Whidby surveyed it, by the Spanish ships *Sutil* and *Mexicana*. They, of course, continued the Spanish name "*Bahia de Gaston*," and both the English and the Spanish name have now found their place on the charts of the bay after the manner already pointed out.

"Point William" ($48^{\circ} 36'$ north latitude, $122^{\circ} 33'$ west longitude,) is the northern extremity of a narrow, long peninsula, which separates Padilla from Bellingham bay. It was first recog-

* Verbal information.

† I could not find who this Gaston may have been.

‡ "*Anegadigon*" Galeana.

nized by Elisa, and named by him *Punta de Sotami*. Under this name we find it on all the Spanish charts. On Vancouver's charts it is called "*Point William*," which name has been continued.

10. "*Point Francis*" ($48^{\circ} 42'$ north latitude, $122^{\circ} 37'$ west longitude) is the southern extremity of a long, low, and narrow peninsula (similar to that of Point William) which projects from the continent to the south and closes Gaston bay. On the Spanish charts I find no name for it.

Vancouver on his charts gives to it the name of Point Francis, which it still bears.

11. "*Elisa's island*" is a small island between Points Francis and William. This island has no name, as far as I know, on former charts; Wilkes called it Elisa's island. * * *

12. "*Lummi island*" ($48^{\circ} 43'$ north latitude, $122^{\circ} 40'$ west longitude) is a narrow island, nine nautical miles long from NW. to SE., which was parallel with Point Francis peninsula, and forms with it "*Hale's Passage*."

It is, like Cypress island, somewhat elevated, and has upon it a mountain called Lummi Peak, of 1,560 feet height.

It was named by the discoverer, Elisa, (1791,) "*Isla de Pacheco*," probably after one of the titles of the Mexican viceroy who sent him. The entire name of this gentleman, the elements of which have been dispersed in the region, was "*Señor Don Juan Vicente de Guemes Pachea y Padilla Orcasitees y Aguago Conde de Revilla Gigedo*."

Vancouver has no name for it. Wilkes called it *MacLaughlin's island*, in honor of Dr. MacLaughlin, the famous and distinguished officer of the Hudson Bay Company, commanding at Fort Vancouver in the year 1841.

An Indian name, Lummi island, probably introduced by the Hudson Bay Company traders, has prevailed over the former.

"*The Lummis*," or Nook Lummis, are an Indian tribe often mentioned in the vicinity of Bellingham bay.*

13. "*Hale's Passage*" ($48^{\circ} 44'$ north latitude, $122^{\circ} 40'$ west longitude) divides Lummi island from the peninsula of Point Francis; it was named by the old Spaniard "*El Canæ de Pacheco*," from the neighboring island.†

Wilkes called it Hale's Passage in honor of Mr. Hale, the ethnographer of his exploring expedition. The same name of "*Hale's Passage*" was given by Mr. Wilkes to another strait in Puget Sound, between Fox island and the great peninsula.

14. "*De Lara's Gulf*," ($48^{\circ} 46'$ north latitude, $122^{\circ} 40'$ west longitude.)—North of Lummi island a little bay is formed by the peninsula of Point Francis in the south and Sandy Point in the north.

This bay was called by the Spaniard (Elisa) "*Ensenada de Lara*" (Lara's Inlet.)‡

The bay has no name either on Vancouver's chart or on those of Wilkes or Kellet. It would therefore be appropriate to restore on our charts one of the old Spanish names, which have too often been neglected, and call the inlet De Lara's bay.

De Lara's bay is the last bay at the northeastern end of Rosario strait, and we now enter the broad waters of the Gulf of Georgia.

15. "*The Gulf of Georgia*," (from $48^{\circ} 46'$ to 50° north latitude, and from $122^{\circ} 40'$ to $124^{\circ} 50'$ west longitude.)

* See De Harley, in Schoolcraft, vol. V, page 701.

† See proofs in Sutil and Mexicana, page 48.

‡ See the proofs for this in Sutil and Mexicana, page 48.

The Gulf of Georgia is a great interior basin between Vancouver's island and the continent of America. It has one hundred and twenty nautical miles in length from SE. to NW., and thirty miles in width. From the middle of the strait it becomes narrow towards the ends. On the south it is connected by numerous passages with De Fuca's strait, and on the north its waters are continued through Johnstone's and Queen Charlotte's strait to the Pacific ocean. Its southwestern shore (Vancouver's Island) is partly broken up by smaller islands, harbors, and inlets. But along its northeastern shore (continental coast) are found much larger and deeper inlets, similar to Admiralty Inlet.

This gulf appears to be not quite as deep as De Fuca's strait, particularly in its southern part, where a great river, Frazer's river, enters, and where the soundings only occasionally exceed thirty fathoms.

Neither Cook nor the early Spanish and French navigators, Perez, Bodega, La Perouse, &c., who saw Vancouver's Island on the Pacific side, suspected the existence of this gulf—they supposed Vancouver's Island to be a part of the continent.

After the year 1789 De Fuca's sound was entered, and, at the same time, on the north, Cape Scott was recognized, and the inlets near Queen Charlotte sound entered. So we see in the charts of Meares and Dixon (1790) Vancouver's Island represented as a peninsula.

The Indians of Nootka Sound had already often reported a large sheet of water behind the island, but were probably not always well understood. In the year 1789 and 1790 De Haro and Quimper looked into the passages which come out from the Gulf of Georgia to the south toward De Fuca strait; and in the year 1791 Elisa entered through one of these passages into the broad Gulf of Georgia, which he explored as far north on the eastern side as our present Howe's sound, from where he saw the waters stretched out to the northwest. He named all these interior waters "*Canal de nuestra Senora del Rosario*," (the channel of our Lady of the Rosary,) I do not however know why. It cannot, however, have been in honor of the so-called Festival of the Rosary, (Fiesta del S. Rosario,) because this falls on the 2d of October, and Elisa was obliged to give up further progress on the 7th August, on account of scurvy and sickness among his crew.* Vancouver, not acquainted with Elisa's name and discoveries, gave to it the name of Gulf of Georgia, from the part of the continent to the east of it which he had named *New Georgia*, in honor of King George III. From the manner in which Vancouver expresses himself about this name in his report,* and also from the manner in which he places this name on his chart, it appears that he included under it also the eastern or interior part of De Fuca's strait, and likewise all the straits of the Archipelago of De Haro. His name runs over all these interior waters.

On the Spanish charts the name Rosario Canal was for a long time retained, and though it had an older date and better claim than that of Vancouver, yet it at last yielded to Vancouver the more powerful authority, and is now confined to that little strait east of De Haro Archipelago. Vancouver's name, Gulf of Georgia, has, however, also been thrown out of De Fuca's strait and confined to the waters north of De Haro Archipelago.

Some American authors seem to have endeavored to allow De Fuca's strait to encroach upon the "Gulf of Georgia." Mr. Greenhow, for instance, has quite expunged the name "Gulf of Georgia" from his chart, and makes the name "De Fuca's strait" run round the whole of Vancouver's Island.

16. *Birch Bay* (48° 54' north latitude, 122° 46' west longitude) is a small cove north of the

* Sutil and Mexicana, p. 2.

southeastern entrance of the Gulf of Georgia. The southeast part of the bay is formed by nearly perpendicular rocky cliffs, while the land to the east is low.

This bay was probably already seen by Elisa and named by him "*Enseñado de Garzon*." A mere comparison of the Spanish charts of the officers of the *Sutil* and *Mexicana* with our modern charts might leave still a doubt whether the Spanish *Enseñada de Garzon* is our Birch bay.

But the circumstances which the said officers relate, that on passing the mouth of *Enseñada de Garzon*, on the evening of June 12, 1792, they then discovered the lights, and saw the two ships of Vancouver's at anchor,* makes the identity of that bay with Birch bay, where Vancouver's vessels were then stationed, quite certain.

It was visited and surveyed again by Vancouver, (June, 1792,) who then made it one of his principal stations, from which he explored the vicinity by boat excursions. He called it "*Birch bay*," because he found birch trees there in abundance.† This name is retained by modern navigators, Kellet, Wilkes, &c.

The southern entrance, Cape of Birch bay, is called "*Point Whitehorn*."

17. "*Peninsula of Roberts' Point*," (49° north latitude, $123^{\circ} 4'$ west longitude.) Birch bay is the last useful, well protected, easily accessible, and deep bay, with good anchoring ground, before reaching the 49° parallel. After this the waters towards the north become very shallow and filled with sand banks, which may be considered as a product of Frazer's river. From the low delta of this river a low, sandy and narrow peninsula runs out and projects towards the south. It includes, to the east, with the equally low coast of the continent, a pretty large bay of about 25 miles in circumference.

This bay, which has to the east two little coves, is throughout very shallow, and in its northern part filled with sand banks; the boundary parallel, of 49° north latitude, cuts right through the middle of this bay, and the southern half only belongs, therefore, to our domain. Neither the bay nor its coves have any name in the British Admiralty charts. They have here only the word "shallow." On the old Spanish Admiralty charts (Madrid, 1795,) it is called "*Enseñada del Engano*," (Deception Gulf,) probably in allusion to its shallowness. The Spaniards had also a name for the low point or peninsula which, in latitude $49^{\circ} 2'$, sets out into this bay from the continent. They call it "*Punta de San Rafael*," (San Rafael Point.) If we have no local names, then we ought to restore the old Spanish names.

The southern part of the "*Point Roberts' peninsula*" is a part of the continent which falls still south of the 49° north latitude. The low peninsula of this point rises in this southern part to high, white, sandy cliffs falling perpendicularly into the sea.

This point and peninsula were first discovered by Elisa, and named by him "*Punta de Cesseda*" and "*Peninsula de Cesseda*." Vancouver gave to the point its present name, "*Point Roberts*," after Captain Henry Roberts, one of the most distinguished officers who had accompanied Cook with Vancouver.

18. "*Frazer's river*."—Though the two principal mouths of Frazer's river fall north of the 49° north latitude and beyond the limits of our domain, still, at least, some sand banks and other products and influences of this river, which may be called a part of the delta, are still included in our boundaries, and we may, therefore, make a few remarks upon the nature and history of this boundary river. We can, however, touch the subject but slightly.

* *Sutil*, *Mexicana*, page 48.

† Vancouver, volume I, page 315.

Frazer's river is, after the Columbia, the largest and most important river of the northwest coast of America. It rises in the Rocky mountains, near 54° north latitude, flows first directly south, and then turns abruptly to the west, in about latitude 20° , breaks through the Cascade mountains about Mount Baker, and empties into the Gulf of Georgia by two principal branches, a few miles north of 49° north latitude, the boundary line of the United States. The river forms there a broad and large delta, which consists of a tract of low, partly swampy, sometimes widely inundated, land. This delta projects into the gulf, like a peninsula, between the two points, Point Roberts (Span Punta Cessedá) and Point Grey (Span Punta Langara.) Between these two points the river has formed broad sand banks and mud flats, which were called by Vancouver the "*Sturgeon Bank*," and which are now sometimes called, from Point Roberts, "*the Roberts' Banks*." This sand bank is from eight to ten miles broad, and its soundings increase, in the direction from east to west, from one to ten fathoms, with which depth it may be said to disappear.

Probably Elisa (1791) had the first suspicion of the existence of a river in this region, which manifests itself very perceptibly even very far out into the gulf by the low delta, by its sand banks, by irregular currents, by large trees and logs carried out into the sea; and further, also, by that deep cut or valley in the Cascade range which plainly appears as a deep depression from the water.*

That Elisa must have concluded, from all this, upon the existence of a river, is evident from Vancouver, who says that, when he was coming from his boat excursion and survey of these shores back to the south, he met the officers of the Spanish expedition, Galiano and Valdes; they expressed themselves astonished to hear that he had not found a river said to exist in the region which he had just explored, and named by one of the Spanish officers Rio Blanco, in compliment to the then prime minister of Spain.† That Spanish officer who named the said river, and of whom Galiano and Valdes had this report, could have been none other than Elisa, because he was the only Spaniard who before them had ever been so far.

Vancouver was wrong only in understanding the river named "*Rio Blanco*." He heard probably "*Rio de Florida Blanca*," for the Count Florida Blanca was then the prime minister of Spain.

Vancouver, who sailed along the low delta of this river, (June 13, 1792,) was unable to approach the shore from the shallowness of the water. He called the bank "*Sturgeon Bank*," and circumnavigated it without suspecting or discovering a river.

Valdes and Galiano, who were at the same time with Vancouver in this locality, (June, 1792,) discovered here, also, the sand banks near the mouth of the river, experienced the current of the river, seen great trunks carried away by these currents, tasted sweet water, and observed, from far in the snowy mountains, a deep, broad cut or valley, ("*una quebrada ancha*,") the valley of Frazer's river; and they, from all this, concluded that there must be a great river in the neighborhood. They supposed it to empty into the salt water canal which Elisa had called "*Canal de Florida Blanca*," (Vancouver's Burrard's canal.) But they searched for it in vain in this canal, and the river remained undiscovered also by them.‡

The same river was, a year after Vancouver, (June, 1793,) discovered and navigated in its upper parts by Alexander MacKinzie, who introduced for it the Indian name "*Facoutche*

* The observation of this depression is mentioned in the account of the Sutil and Mexicana.

† Vancouver, vol. I, page 314.

‡ See account of the voyage of the Sutil and Mexicana, page 64.



Dr Cooper del.

J. Bien N. Y. lith

MT BAKER & CASCADE RANGE—FROM WHITBY'S ISLAND

Fessee," (said to signify great river.) After this it was supposed to be a branch of Columbia river. After the year 1806, Mr. Harmon, of the Northwest Company, explored many upper branches of this river.

In the year 1812 another agent of the Northwest Company, Mr. Frazer, reached again from the interior, traced it very far down, and made it nearly certain that it was not a part of the Columbia river, but that it entered into the Gulf of Georgia. Since that time the river has been called Frazer's river.

The first European who passed down the whole river from its head to its mouth, and who observed more accurately the longitudes, latitudes, and turning of its course, was *Sir George Simpson*, governor of the Hudson Bay Company's territories, in the year 1828.

19. Mount Baker ($48^{\circ} 40'$ north latitude, $44^{\circ} 40'$ west longitude) is one of the loftiest and most conspicuous peaks of the northern Cascade range; it is nearly as high as Mount Rainier, and, like this, its snow-covered pyramid has the form of a sugar-loaf. *It is visible from all the water and islands which we have just described, and from the whole southeastern part of the Gulf of Georgia, and likewise from the eastern division of the Strait of De Fuca.* It is for this region a natural and important landmark, as Mount Rainier is for Admiralty Inlet.

The Spaniards, Quimper and Elisa, (1791,) were probably the first discoverers of this mountain, and called it "*La Montaña del Carmelo.*" This may be concluded from the circumstance that the historian of the expedition of the *Sutil* and *Mexicana* (1792) uses the name as an already old and known appellation."* It seems, however, that this name was not given exclusively to this peak, but to the whole snowy range between Mount Baker and Mount Rainier.

On the expedition of Vancouver, Lieutenant Joseph Baker, of the ship *Discovery*, discovered this mountain for the first time in the afternoon of the 30th of April, 1792, at the ship station near Fort Discovery, from which point it bore north 43° east. Vancouver called it after him, "*Mount Baker,*" which name it has always retained. Mount Baker, which stands quite near the 49th degree of north latitude, may be said to be the northwestern boundary pillar of the territory of the United States, and with it we conclude this review.

* For instance, on page 47 of the *Sutil* and *Mexicana*.

CHAPTER IV.

METEOROLOGY.

COMPARISON OF NEBRASKA WITH REGIONS HAVING A SIMILAR CLIMATE IN EUROPE.—CLIMATE OF WASHINGTON TERRITORY.—GENERAL CONCLUSIONS.—COLD AS AN OBSTRUCTION TO THE RAILROAD ROUTE.—SNOW AS AN OBSTRUCTION TO THE RAILROAD LINE.—OBSERVATIONS ON THE ISOTHERMAL CHART.—TABLE OF MEAN TEMPERATURES AT STATIONS BETWEEN THE MOUTH OF THE ST. LAWRENCE AND PUGET SOUND.

COMPARISON OF NEBRASKA WITH REGIONS HAVING A SIMILAR CLIMATE IN EUROPE, &c.

Nebraska and western Minnesota (called Dacotah) lie between the parallels of 40° and 49° north latitude, and may be limited for the present comparison by the Rocky mountains, which form its western boundary, and a line running parallel to them in a northwestern direction, from the intersection of the Missouri with latitude 46° to latitude 49°, giving an average width of 650 miles, and an area of 350,000 square miles. This large area has, in the plains, mean temperatures as follows, stating the means for each season as observed at stations as near as possible to each of its four corners.

Southeast corner: Fort Kearney, 6 years' observations, latitude 40.38, longitude 98.57, altitude 2,360.

Spring	46.80
Summer	71.50
Autumn	49.30
Winter	23.00
Year	47.70

Southwest: Fort Laramie, latitude 42.12, longitude 104.47, altitude 4,519.

Spring	46.80
Summer	71.90
Autumn	50.20
Winter	31.10
Year	50.10

Northeast: Fort Garry, latitude 50.15, longitude 96, altitude 850.

Spring	35.79
Summer	67.76
Autumn	40.88
Winter	6.85
Year	34.38

Northwest: Fort Benton, latitude 47.50, longitude 110.36, altitude 2,790.

Spring	49.90
Summer	72.80
Autumn	44.50

Winter.....	25.40
Year.....	48.20

The moisture deposited during each season is expressed, as nearly as possible, by the following registers at the same places:

	Spring.	Summer.	Autumn.	Winter.	Year.
Fort Kearney.....	10.80	12.05	3.82	1.31	27.98
Fort Laramie.....	8.69	5.70	3.96	1.63	19.98
Fort Benton.....	4.92	1.00 ?	2.10 ?	5.10	13.12
Means for the region.....	8.13	6.25	3.29	2.68	20.36

But these posts are on the borders of the dry plains lying between them, and known to have a drier climate, so that to be within the bounds of probability the mean of the two lowest records may be used for that of the whole region, which gives: for spring, 6.80; summer, 3.25; autumn, 3.03; winter, 3.36, year, 16.55.

The records kept for twenty-three months during the years 1855-'56-'57, at Fort Pierre, give the following results: spring, 4.66; summer, 3.30; autumn, 3.81; winter, 2.27; year, 14.14 inches.

This post is probably in the very driest part of the whole country, being at a distance from the rains which descend upon the eastern part of the country towards the Mississippi, and also from the local influences exerted by the Rocky mountains on the west. The records being unreliable at Fort Garry, those of Fort Ridgley, Minnesota, latitude $44^{\circ} 15'$, longitude —, altitude 1,100 feet, may be substituted, giving for the northeast borders, five years: spring, 7.39; summer, 8.73; autumn, 5.98; winter, 6.04; year, 28.14; and for region: spring, 7.76; summer, 7.49; autumn, 4.63; winter, 4.36; year, 24.25.

The only country of the old continent which can be compared with this in extent and climate, as well as in some degree in natural features, is the empire of Russia, concerning which the following facts are extracted from Tegoborski's "Commentaries on the productive forces of Russia," published in London, 1855.

"6. *Region of the Steppes.*—The steppes extend from the mouth of the Danube along the shores of the Black sea, the Sea of Azow, and across the lower parts of the Don, the Volga, and the Ural, into the plains of central Asia. It embraces the governments of Bessarabia, Kherson, Ekatherinslaw, Taurido, (Crimea,) Stavropol, (Caucasia,) Astrachan, and the country of the Don Cossacks."

These all lie between latitude 49° and the Black sea, excepting Stavropol and Astrachan, which extend south, between it and the Caspian sea, latitude 44° .

The area embraced in these provinces is 244,525 square miles,* and the remainder of the surface southward, to latitude 40° , is mostly occupied by the Black sea and the Caucasian mountains, which, of course, are to be disregarded in a comparison of plains, although they might to some extent represent the Black hills and other mountains of Nebraska.

For comparison of climate the three following places in these provinces may represent Forts Kearney, Laramie, and Benton.

	Spring.	Summer.	Autumn.	Winter.	Year.	No. years.
Benton, Tagaurog, latitude $47^{\circ} 12'$ -----	46.6	70.2	47.8	22.3	46.8	16
Kearney, Catherinoslaw, latitude $48^{\circ} 20'$ -----	46.5	70.3	48.7	19.6	46.3	10
Laramie, Odessa, latitude $46^{\circ} 29'$ -----	45.7	70.1	50.7	27.4	48.4	8

No point in this region has winters so cold as those of Fort Garry, and the nearest approach to its climate in Russia is found as far north as Kasau, on the Volga. Kasau, latitude $55^{\circ} 48'$: spring, 36.2; summer, 62.4; autumn, 36.9; winter, 6.3; year, 35.5; number of years, 10.

In comparing the amount of moisture deposited in rain and melted snow the following places are selected, there being no records of the places used in comparison of temperature:

To represent Fort Kearney, Kursk, latitude $51^{\circ} 44'$, four years' observations: spring, 5.57; summer, 9.27; autumn, 4.02; winter, 1.95; year, 20.81.

For Fort Laramie, Tiflis, latitude $41^{\circ} 42'$, six years' observations: spring, 6.25; summer, 7.62; autumn, 3.51; winter, 1.88; year, 19.26.

For Fort Pierre, Simferopol, latitude $44^{\circ} 57'$, five years' observations: spring, 3.22; summer, 6.01; autumn, 3.40; winter, 2.20; year, 14.83.

For Fort Benton, Bakou, latitude 40.22 , three years' observations; spring, 3.34; summer, 1.48; autumn, 3.07; winter, 4.32; year, 13.38. No point within the limits has so much precipitation as Fort Ridgley, but it comes nearest to Catania, in the fertile island of Sicily, or parts of Prussia and Italy, but has a larger precipitation in spring and summer. Catania, latitude 37.50 , eight years' observations, has for spring, 7.29; summer, 0.63; autumn, 10.46; winter, 9.75; year, 28.13. The record for Fort Benton being quite incomplete, further observations will, doubtless, give it more moisture, approaching the mean for Fort Laramie, if not exceeding it, since near the western coast more is deposited northward than southward.

The data for European localities are copied from Blodgett's Climatology, where Dovè is given as authority for most of them, and they may, therefore, be considered very reliable. In geological formation and soil the same remarkable similarity is apparent. "Mr. Haxthausen divides the steppes geagnostically into five classes or formations:

"1. The calcareous tertiary formation predominates in Bessarabia, in Podolia, and in a small part of the government of Kherson.

"2. Chalk forms the basis of the soil in the north, and embraces the steppes in the governments of Kharkow, Wosonige, Tanubow, part of the country of the Don Cossacks, and of the government of Saratow.

"3. The granitic basis, which is derived from the Carpathians, extends along the Black sea and the Sea of Azow, on to the Caucasus.

"4. The mud steppes extend on the southwest along the Kanhaw and the Terek.

"5. The steppes with a saline basis extend on the east to the river Taïk."

Nos. 1 and 2 are precisely the tertiary and cretaceous formations which form nearly all the plains of Nebraska, &c., west of the 98th meridian; No. 3 is found along the foot of the mountains; No. 4 is represented in the alluvial river bottoms; and No. 5 occurs in scattered situations in the western part of the Territory. Nebraska has also carboniferous limestones,

sandstones of different ages, and other rocks not mentioned as occurring in that portion of Russia.

In the classification of the relative fertility of soils in the various provinces of Russia, those here described are grouped as follows: "Soil in general of great fertility; Bessarabia, (Koursk. *) A large portion of the soil very fertile; Ekatherinoslaw, Taurido, Kherson, Stavropol, Don Cossacks country. Soil very meagre and ungrateful, either from its rare qualities or from the climate; Astrakhan." In another table is given the proportion of meadow to arable land in each province, with the following figures to each hundred: "Koursk, 24.5; Bessarabia, 92.3; Ekatherinoslaw, 108.2; Kherson, 142.9; Taurido, 213.3; Stavropol, 533.3; Astrakhan, 533.3." And of forest land the proportions are: "Koursk, $\frac{11}{100}$; Bessarabia, $\frac{5}{100}$; Taurido, $\frac{4}{100}$; Don Cossacks country, $\frac{2}{100}$; Kherson, $\frac{1}{100}$; Ekatherinoslaw, $\frac{1}{100}$; Stavropol, $\frac{8}{100}$; Astrakhan, $\frac{8}{1000}$."

The land actually under cultivation is in the following proportions: "Koursk, 60.7 per cent.; Bessarabia, 30.1; Kherson, 20.9; Ekatherinoslaw, 19.7; Don Cossacks country, 15.6; Taurido, 12.8; Stavropol 5.6; Astrakhan, 1." Of the remainder only a very small portion is estimated to be occupied by forests, and it is estimated that "in the eastern and southern provinces, and in all the countries of the steppes in general, more than half the uncultivated land, and frequently more than two-thirds of it, is used for pasture."

The following general remarks might be applied almost verbatim to Nebraska:

"This region," (the steppes,) "which occupies about a fifth of the whole possessions of the Russian empire in Europe, or more than twice the extent of France, is, both from its immense extent and from its geographical position, called to take an important part in the gradual development of the productive forces of Russia, and deserves on that account our particular consideration. The opinions which we have heard expressed with regard to the agricultural capabilities of these countries are various and conflicting. Some consider the larger portion of the steppes as unfertilizable deserts; others, dazzled by the prosperity of some isolated colonies, believe nothing wanting but hands and judicious culture to convert them into rich and fertile places.

"We have always thought it probable that the truth must be somewhere betwixt these two extreme opinions, and we have been confirmed in our surmise by the perusal of a paper by Koeppa. Amongst other peculiarities of the steppes, a very prominent and the most distinctive one is the absence of timber. In some places the stratum of soil proper for vegetation is not deep enough to admit of trees taking root; in others it is the vigorous growth of the grasses, which prevents the development of forest vegetation unaided by the care of man. Opinions differ greatly as to the possibility of wooding it anew. Upon comparing all the information we possess upon this point, it may, we conceive, be laid down as certain that in part of the steppes sylviculture is impossible, or at least too difficult and costly to warrant the attempt, whilst in other portions partial plantations and sowing would be a very practicable undertaking, holding out a fair promise of a large ultimate benefit. The most suitable localities for such improvements would be the banks of rivers and the numerous ravines formed by the infiltration of rain water.

"The upper stratum of the soil presents every variety of composition, from shifting sands and saline impregnations to the most fertile composts. As this stratum generally rests upon a basis not very accessible to infiltration, it is upon its thickness that the degree of its fertility depends. Where it is not deep enough to retain the moisture, it easily becomes saturated with

* This, though north of latitude 49°, is compared with Fort Benton, having a climate colder and drier.

rain water and as easily dried up by evaporation. This is, of course, an impediment to culture in countries where droughts are so frequent and of so long duration that it is nothing uncommon for twenty months to pass without a single copious shower of rain. It is not so bad as this in all the steppes, but such is at least their predominant character in several governments of the south and east. This infrequency of rain, joined to the want of reservoirs, forms notoriously one of the chief drawbacks of the country; but the vegetation of that part of the Steppes which is used merely as pasture possesses a peculiar character, by which the deleterious influence of drought is diminished.

"Nature here exhibits her wonderful variety of resource. Spring vegetation generally lasts in these countries for about three months; if this period pass without a sufficiency of rain the herbage does not attain its natural height; it is dried up whilst its sap is still in full vigor, and in this state it affords a substantial food for cattle for the space of nine months. These pastures are particularly suitable for sheep. When on the other hand the spring rains happen to be in excess, the vegetation becomes too rank, the herbage attains four times its usual height, the pasture at the same time becomes less wholesome and nourishing, so that by a strange anomaly in this country, where the general complaint is of drought, those proprietors who possess heavy stocks of sheep prefer a dry season to a superabundance of moisture.

"The vegetation of the pasturage steppes presents another peculiarity, namely, that it is not equally spread over the surface of the soil, but is found scattered as it were in little islands. A continuous sward is to be met with only in very low valleys."

In reading this account the traveller who has been across Nebraska must be struck with the similarity of the general character of both countries; but it remains for more complete surveys to determine what proportion of the country will be found to be "perpetual plains," (that is, those in which cultivation is difficult, and the culture even of fruit trees requires incessant attention,) and what portions will admit of general cultivation.

The statistics of two years' cultivation of one of the estates situated in a *perpetual* steppe in the Crimea shows the average returns of wheat and rye to be 6, barley 7, and millet 23. Some years there was a return of 16 from rye, 15 from wheat and barley, and 64 from millet, but there was one year when the harvest was a complete failure, and others when it barely returned the seed. Simferopol, which has about the same moisture as Fort Pierre, is in this region, but its temperature approaches nearest to that of Odessa and Fort Laramie.

Another author quoted by Tegoborski classifies the empire of Russia in regard to physical culture in eight zones, as follows:

1. The icy zone. 2. The marshy zone; both inhabited chiefly by Laplanders.
3. Zone of forest and of cattle rearing; the northern part inhabited by Nomades, and the southern only showing any cultivation.
4. Barley zone, where, from the shortness of the summer, only this grain, potato, and a few garden vegetables can be cultivated, extending south to latitude 63°.
5. Zone of rye and flax, which are the most successful crops, extends south of latitude 51°.
6. Zone of wheat and garden fruits, extending south to Ekatherinoslaw, or to the 48th degree, and including Kusok, thus entering the region which we have compared with Nebraska as to soil and climate. "The provinces which it embraces supply the provisions of St. Petersburg and of a great part of the army, besides furnishing cereals in considerable quantities for exportation. The culture of tobacco begins to acquire importance, and is much more extensive than in other parts of the empire."

"7. Zone of maize and of the vine. This zone embraces Bessarabia, New Russia, the country of the Don Cossacks, the government of Astrakhan, the provinces of the Caucasus, and the Crimea. Independently of all the productions of the preceding zones, the vine is cultivated with success in several parts of this region, and the culture of maize is widely diffused." Locusts (grasshoppers) and droughts are, as in Nebraska, the chief obstacles to cultivation in Kherson and Ekatherinoslaw, and pasturage of cattle occupies more and more of the steppes in going east. Even in Astrakhan, which presents but a meagre pasturage, the soil is tolerably well adapted to the culture of the vine." "The cultivation of gardens and the rearing of sheep are carried on to a considerable extent in this zone, but this part of Russia is essentially deficient in forests. More care ought to be devoted to the working of coal, of which extensive strata have been discovered."

Thus it appears that these very provinces, in spite of their arid climate, are the most productive portions of Russia in Europe.

The following table gives the population in 1851 of these provinces, and their number per square mile:

Provinces.	Population, 1851.	Per square mile.
Koursk.....	1,728,000	98
Stavropol.....	1,004,000	17.6
Ekatherinoslaw.....	994,000	38.8
Kherson.....	919,000	32
Bessarabia.....	902,000	49.8
Don Cossacks.....	798,000	12.6
Taurido.....	665,000	26.6
Astrakhan.....	207,000	8.8
Total.....	7,217,000	Mean 35.5

The area of these provinces is 262,000 square miles, or a little more than two-thirds of the area of the country compared with it. Now we may see what amounts and what kinds of products are actually raised by these inhabitants from this area. It must be observed that the author classifies only the first of these as "exceedingly well peopled," or with more than 65 to the square mile, while three are of medium population, (over 32.5 to the square mile,) and the other four "weakly peopled," (with less than 32.5 to the square mile.) They are also the provinces which are attracting most attention, and whose population is increasing most rapidly by immigration from the more northern and barren regions.

Grain.—Of the provinces above mentioned, five produce more than they consume, two only sufficient for home consumption, and only one, Astrakhan, imports it. The average return for the same provinces is six times the amount of seed sown, while for the whole empire it is only four. Wheat is cultivated to some extent, but rye is more common, while barley, oats, buckwheat, and maize or Indian corn are abundant, the latter being found only in these provinces.

Potatoes are less cultivated than towards the north, apparently from prejudice, but the amount raised in the five provinces bordering on the Black sea in 1847 was 2,108,160 bushels.

Beet root sugar is one of the most important products of Russia, and the amount for 1848 in Kursk and Khessonalow was 1,093,585 pounds from 2,324 acres employed in this manner.

Wines.—Only the provinces south of latitude 49° produce the vine, and of these the six here considered are the principal. In 1849, these produced 24,245,000 gallons, worth 2,804,100 dollars. If similar climate and soil prove anything, the same kind of vine should succeed as well in most parts of Nebraska.

The hop vine is native and abundant in the hilly parts of Nebraska and Washington Territories; and two or three native species of flax may become worthy of cultivation in both places.

These provinces also produce the principal part of the *fruits* of Russia, especially apples.

Garden vegetables are, however, less productive. Hay and other fodder, being naturally supplied in abundance, is not much cultivated.

Flax is cultivated only for the oil of its seeds, though it succeeds well. *Hemp* is not produced.

Tobacco in these provinces is produced to the extent of about 2,500,000 pounds, the best being from Kherson and Taurido, and worth 20 cents a pound. This is probably the Turkish tobacco, which will grow in a dry climate.

The products of the great extent of grazing land form, however, a much more important source of wealth to these provinces; and the following numbers show what proportion of various stock may be expected as the future animal wealth of Nebraska:

Horses, 2,015,190; cattle, 4,754,450; sheep, 11,950,110. To the square mile: horses, 8; cattle, 18; sheep, 42; which, deducting the proportion of land otherwise used, would be much increased.

Hogs, poultry, bees, and silkworms also form a large proportion of the producing stock of these provinces, but need not be here included in the special estimates.

The export of wheat from the two ports of Odessa and Taganrog is over 18,000,000 bushels, while the three other principal ports, Archangel, St. Petersburg, and Riga, export only about 6,000,000 bushels, thus showing the far greater productiveness of the provinces bordering on the Black sea in this important staple.

Agricultural products of Red River valley from Pembina to Fort Garry, latitude 49° to $50^{\circ} 15'$.—
(*Report on Exploration between Lake Superior and Red River Settlement, Toronto, 1858, p. 319.*)

Indian corn may always be expected to ripen, and is a sure crop on the dry parts of the prairie, while the rich and moist soil requires draining to produce it. The Horse-tooth and Mandan varieties are those cultivated. It was found growing and ripening near the mouth of Winnipeg river, latitude $50^{\circ} 30'$.

Wheat.—This is the staple crop, and its general success and good quality are well known. Forty bushels to the acre is a common return on new land, and a Mr. Gowlee obtained fifty-six, with no improvement except deep ploughing to make the land dry. *Wet springs* are the greatest obstacle to its success, and the only reason it is not more cultivated is the want of a market. Rust and fly were unknown, but the *grasshoppers* have been very destructive. *Barley and oats* are so easily raised that they were not considered worthy of special notice.

Hay.—The natural growth is unlimited in quantity and excellent in quality.

Hops.—These grow wild everywhere and with the greatest luxuriance.

Peas.—Grow well and yield abundantly.

Tobacco is cultivated to a small extent, but appears to be badly dried and manufactured.

Potatoes are particularly distinguished for abundance, size, and quality.

Turnips, beets, &c.—All kinds of root crops grow well and obtain large dimensions. All common garden vegetables grown in Canada being equalled, if not surpassed.

Sugar.—Considerable quantities of sugar are made from the Ashlewood maple; but unless the tree is protected and planted the supply is likely to fail.

Flax and hemp were formerly much cultivated, but the want of markets or of machinery caused them to be discontinued, though the product was of excellent quality.

Lumber is to be got only in narrow strips, along the river banks, consisting of elm, oak, maple, and poplar, (cotton-wood.) On the ridges are small aspens and pines. Abundant good pine grows, however, east of Lake of the Woods and Lake Winnipeg.

Live stock.—Horses, cattle, and hogs are increasing, but sheep diminishing in number, there being no use for their wool. They do not pay for raising. The prairies offer great advantages for stock raising; but there being no market for beef, mutton, tallow, hides, wool, &c., few, comparatively, are raised. The abundance of buffalo, and the greater relative value of their skins, meat, &c., with the strong inclination of the people to a hunter's life, also tend to prevent stock raising.

Climate.—Compared with Toronto, the results for the year show that at the Red river settlement, latitude $50^{\circ} 15'$, as compared with Toronto, (latitude 44° , nearly,) there is:

Summer nearly 4° warmer.

Summer rains $21\frac{7}{100}$ inches more.

Mean of spring and summer nearly 1° higher.

Winter, $12^{\circ}.62$ colder.

Year, $8^{\circ}.12$ colder.

Annual rain and melted snow, $17\frac{8}{100}$ inches more. Snow, $33\frac{4}{10}$ inches less.

Winter extends through November, December, January, February, March. Spring and autumn only two months each.

The prevailing character of the winter months are long-continued, intense cold, with a clear, dry atmosphere. Mercury often freezes and remains congealed for many days together. In calm weather the intensity of the cold is not much felt, causing no suffering; in fact, the half-breeds and Indians camp out in the open plain during the whole winter, their only protection being a buffalo skin tent and plenty of robes.

The salubrity of the climate is shown by the fact that one medical man is not overburdened with work in a population nearly reaching 7,000.

CLIMATE OF WASHINGTON TERRITORY.

In the preceding pages the region having the most unfavorable climate of any on the route has been selected for comparison with southern Russia as to its capacity for agriculture. West of the Rocky mountains the comparison is much in favor of Washington Territory, as will appear by the following records:

Bitter Root valley, (Fort Owen,) latitude 46.20 , longitude 113.55 ; altitude 3,400 feet; $1\frac{1}{2}$ year's observations: temperature, spring, 47.00 ; summer, 69.60 ; autumn, 45.50 ; winter, 27.62 ; year, 47.43 . Compared with Taganrog this shows an excess of 0.63° in the year, and 5.32° for winter, the other seasons being much the same at each place. No records of moisture exist, but the abundance and luxuriance of the forests in that part of the Rocky mountains, as well as the actual products of agriculture, show that it is quite sufficient. Its climate is superior

to that of Rochester or of any part of western New York, Michigan, Wisconsin, or Minnesota, as shown by the annexed table.

	Latitude.	Spring.	Summer.	Autumn.	Winter.	Year.
Rochester.....	43 07	44.6	67.6	48.9	27.0	47.0
Detroit	42 20	45.9	67.6	48.7	26.8	47.2
Beloit	42 30	45.6	70.9	50.1	24.2	47.7
Fort Snelling	44 53	45.6	70.6	45.9	16.1	44.6

The two latter are the warmest points recorded in their States.

Laperai, Kooskooskia valley, latitude $46^{\circ} 27'$, longitude 117° , altitude 1,000 feet; $2\frac{1}{2}$ years' observations for temperature gives: spring, 51.0; summer, 70.3; autumn, 51.2; winter, 36.9; year, 52.4.

Walla-Walla, latitude $46^{\circ} 03'$, longitude $118^{\circ} 25'$, altitude, 600 feet; $1\frac{1}{2}$ years: spring, 51.85; summer, 73.06; autumn, 53.59; winter, 34.11; year, 55.15. Dalles, latitude $45^{\circ} 36'$, longitude $120^{\circ} 55'$, altitude, 200 feet; $3\frac{1}{2}$ years: spring, 53.00; summer, 70.36; autumn, 52.22; winter, 35.59; year, 52.79. Of these, the mean may represent the climate of the Great Plain and of the valleys connected with it up to latitude 49° , which are about of the same or a lower elevation, giving us: for spring, 51.95; summer, 71.24; autumn, 53.00; winter, 35.63; year, 52.66. The following places may be compared with this or with each separately: Paris, (France,) latitude $48^{\circ} 50'$, spring, 50.6; summer, 64.5; autumn, 52.2; winter, 37.8; year, 51.3. Sebastopol, latitude $44^{\circ} 36'$: spring, 51.6; summer, 70.6; autumn, 53.7; winter, 35.9; year, 53.00; and the other places in southern Russia already compared with Nebraska.

	Latitude.	Spring.	Summer.	Autumn.	Winter.	Year.
Vienna, (Austria).....	48 13	51.6	69.4	51.2	31.9	51.0
Philadelphia	39 56	51.8	73.6	54.1	32.9	53.1
Washington City	38 53	55.8	76.3	56.4	36.1	56.1
St. Louis, Missouri	38 40	54.1	76.2	55.4	32.3	54.5
Cincinnati, Ohio.....	39 06	53.7	74.0	53.9	33.7	53.8

With respect to moisture, no records exist for Laperai, but the same remarks may be applied as are made on Bitter Root valley; Walla-Walla and the Dalles, however, are drier in climate, as shown by the records, Fort Walla-Walla, $1\frac{1}{2}$ year's observations: spring, 6.40; summer, 2.85; autumn, 4.54; winter, 7.10; year, 20.89. Dalles, $3\frac{1}{2}$ years: spring, 2.63; summer, 0.42; autumn, 4.16; winter, 7.11; year, 14.32. Mean: spring, 4.51; summer, 1.63; autumn, 4.35; winter, 7.11; year, 17.60.

Taking either the mean or the lowest as the average for the whole of the Great Plain, we find that they compare favorably with Nebraska, and, consequently, with southern Russia, while, as we have seen, they surpass both in temperature. Actual experiment has shown the perfect success with which nearly all crops of the middle United States can be cultivated in the Walla-Walla valley, and at several other points near the Great Plain. Compared with other

parts of the interior of the continent southward and the coast of southern California we have a decided advantage.

	Spring.	Summer.	Autumn.	Winter.	Year.
Laredo, Texas.....	4.07	7.33	5.06	2.20	18.66
El Paso, New Mexico.....	0.70	3.56	5.25	1.70	11.21
Albuquerque.....	1.10	5.45	2.07	0.80	9.42
Fort Yuma.....	0.27	1.30	0.86	0.72	3.15
San Diego, California.....	2.74	0.55	1.24	5.90	10.43
Monterey, California.....	4.43	0.21	1.65	5.91	12.20
Benicia, California.....	6.40	0.01	2.65	7.56	16.62

All the interior of California has about the same amount as the last place quoted.

In the comparison of climate, as deduced from these observations in the vicinity of the Rocky mountains and thence to the Pacific, it must be remarked that the means of the series of observations at 7, 2, 9 will not approach so near the means of the twenty-four hours as they do in countries of more uniform surface. As is well known the nights are always cold among mountain ranges, no matter how high the temperature may rise during the day. The only series of observations from which corrections for the mean temperature of the twenty-four hours can be approximately deduced is that made at Sacramento, California, by Dr. T. M. Logan, and published in the Smithsonian Report for 1857. These have not been extensive enough to warrant their adoption as constant, but they give a good idea of this great diurnal range in the thermometer. From his series of hourly observations, made on only one day in each month, it appears that the hours when the temperature approaches nearest the mean for the day are: in—

Spring, 7.30 to 9.53 a. m.; 8.16 to 9.19 p. m.

Summer, 7.33 to 8.54 a. m.; 8.6 to 8.47 p. m.

Autumn, 8.42 to 10.47 a. m.; 9.55 to 12.35 p. m.

Winter, 10.45 to 11.30 a. m.; 9.30 to 12.30 p. m.

The difference between the hourly mean and that derived from the three daily observations is, for spring, $1^{\circ} 20'$; summer, $1^{\circ} 24'$; autumn, $+ 0^{\circ} 16'$; winter, $+ 0^{\circ} 14'$; year, $+ 0^{\circ} 56'$, to be added or subtracted from the mean of observations made at the hours of 7, 2, and 9. At Rochester, New York, it has been ascertained, by a long series of careful observations made by Professor Dewey, to be, for observations made at the hours of 7, 2, 9, spring, $- 0^{\circ} 82'$; summer, $- 0^{\circ} 81'$; autumn, $- 0^{\circ} 51'$; winter, $- 0^{\circ} 47'$; year, $- 0^{\circ} 65'$. If, as is most probable, the Sacramento corrections approach nearest to the truth for the interior of Washington Territory, we have an unexpected additional testimony in favor of its winter climate, as well as its mean annual temperature.

The deduction of 1.24 from the summer heat is, however, less than was to be expected. The cold nights show their principal effects on vegetation, in the fact that Indian corn, and perhaps some other crops, which are the chief products between the latitudes of New York and Baltimore, where the summer heat is similar, are not certain crops, though cultivated even at Fort Colville and at other places to the southward. They succeed well, however, in Walla-Walla and the Nez Percés country.

Dr. Logan says of Sacramento: "One of the most striking features of the climate is the

greatest reduction of temperature after the hour of maximum elevation. However high the wave of temperature towers up under the influence of a vertical sun and cloudless sky, it sinks proportionately low during the night, rendering it cool and chilly.' The range of difference is there sometimes 41° in July, and the mean range for that month 22.07. The range for the three summer months is 19.57 or 79.73 for the greatest heat by day, and 60.82 for the mean coldest hour of the night. This evidently arises from the fact that the more the air is rarefied and ascends by day, the more cold air from the neighboring snowy mountains must rush down to take its place at night, until, as in August, even that of the mountains becomes so heated that the minimum range of 16.34 is reached. His table is the result of two years' observations. The range will be less in direct ratio to the distance of any given place from the snowy or lofty mountains. It is probably, also, less where, as in this Territory, the greatest heat by day differs least from the mean, or from the mean temperature of the neighboring mountains.

One of the greatest agricultural advantages of the climate near the Pacific coast is in the earlier commencement of spring and later coming of winter, which makes the growing season at least a month longer, and prevents the droughts of summer from seriously interfering with cultivation.

This fact is shown to exist by the comparison of the means for the three winter months, as already made in the tables of climate in places of similar annual temperature. It is also well known to characterize and influence materially the processes of agriculture in California and elsewhere. To demonstrate its application to the region now under consideration I give a table of comparison of February, March, and December, with places already used in this connexion:

Bitter Root valley, means of two years.

	February.	March.	December.
	°	°	°
	30.7	35.5	29.5
Rochester, New York, 24 years.....	26.4	33.1	28.5
Detroit, Michigan, 13 years.....	26.6	35.4	26.9
Beloit, Wisconsin, 6 years.....	25.8	33.8	24.0
Fort Snelling, Minnesota, 35½ years.....	17.6	31.4	16.9
Fort Benton, Nebraska, 1 year.....	26.6	36.2	33.0
Laperai, 2½ years.....	38.8	42.7	40.4
Walla-Walla, 1½ years.....	34.5	42.7	38.6
Dalles, 6 years.....	40.0	46.4	33.7
Vienna, Austria.....	33.5	40.8	33.0
Philadelphia, 20 years.....	36.3	45.6	27.1
Washington, 13 years.....	36.7	45.3	37.3
St. Louis, 23 years.....	35.0	44.0	33.6
Cincinnati, 20 years.....	34.1	43.5	34.5

We thus find that cultivation may be commenced some days earlier in the Territory than at places several degrees further south in the Atlantic States, and some *weeks* earlier than in places of the same latitude. Allowing for the close vicinity of all the western territory posts to mountain ranges, we may suppose that a still greater difference exists in certain localities on the Great Plain, where the greater dryness of summer also requires an early cultivation for

success. The difference will be at once apparent, to farmers especially, as a mean temperature below 32° prevents ploughing in winter and various other operations, and stops entirely the growth of several winter crops, which, in the mild winters near the western coast, make considerable progress. Grazing is excellent throughout, precluding the necessity of laying up much supply of fodder.

Even comparing the elevated interior with various places much further south, we find the advantage still in our favor:

	Latitude.	Altitude.	Years obs.	February.	March.	December.
	° ' "	Feet.		°	°	°
Albuquerque, New Mexico -----	35 6	5,032	5	39.6	47.9	36.0
Fort Laramie, Nebraska -----	42 12	4,519	6	32.6	36.8	28.0
Salt Lake City -----	40 46	4,351	31 $\frac{1}{2}$	35.0	39.7	34.1

which will not be exceeded in any part of the interior of Oregon, except near the Columbia, on account of the greater elevation of all parts of that country.

Having, as already shown, more moisture deposited during winter and spring than any point in Nebraska, or near latitude 32° to 35° , and having a spring allowing of earlier cultivation than the former, and even many parts of the latter region, there seems no climatic reason why the interior of Washington Territory should not produce abundantly all that can be cultivated in them, even without irrigation, or even more, as in the case of California.

Dr. Logan considers February the first month of spring at Sacramento, and includes only December and January as winter months. Adding to these half of February and half of November, we may consider the three months thus formed the agricultural winter of the great plain. Mr. Blodgett estimates it at one hundred and ten days for Laperai from November 11 to February 28, and seventy days at San Francisco.—(*Climatology*, p. 500.)

Of the climate west of the Cascade mountains little need be said in addition to what is contained in Vol. I.

It was then stated that along the coast the prevailing sea breezes from the southwest in winter, and the northwest winds in summer, so modify the climate that the isothermal lines run nearly parallel to the coast, making the climate of Puget Sound nearly as mild, and in summer more agreeable than at San Francisco, while it corresponds closely with that of the western coast of Europe in the same latitude, and especially that of the British islands. The effect of this amelioration from the prevalence of the southwest sea breeze is felt in winter, as has been here shown, as far east as Fort Union, on the Missouri, and has a constantly apparent effect on all the country east to Fort Benton.

The tables given in volume I show that the extremes both of summer and winter are from 5° to 10° less than in the interior, and that it is as abundantly supplied with moisture as any part of the United States.

Later records tend to show that the average amount at Steilacoom and Vancouver has been over estimated, and from forty to forty-five inches annually would be nearer the truth. Most of it falls during the colder months, and two or three of the warmest are usually quite dry, thus favoring the gathering harvests. Some rain, however, falls during every month, especially west of the Coast range, and no complaint of *drought* can be made against the climate. From

the greater coolness of the summers, Indian corn, except as a green vegetable, does not generally succeed, and perhaps a few other products of California may be found unprofitable, but for others, especially orchard fruits, that State is surpassed.

GENERAL CONCLUSIONS.

The favorable conclusions as to the climate of the country in the route of the expedition, stated in the first report, have been fully sustained by more recent observations.

As shown by the accounts of all who have traversed the Rocky mountains, during almost every winter month the snow there met with would not present the slightest impediment to the constant passage of railroad trains. And, in regard to temperature, the whole of these mountains between Fort Benton and Bitter Root valley, a distance in a straight line of 190 miles, have a milder winter climate than Wisconsin or Iowa, or any part of Nebraska east of the 100th meridian. A mean temperature of 20° to 25° must prevail throughout, excepting about five miles of the dividing ridge, which, rising 2,500 feet above the Bitter Root valley, and 3,400 above Fort Benton, will, by the rule already stated, fall to a mean of 16° ; though from its very narrow extent, and the almost constant influence of the west winds, it must usually approach nearer the climate of Bitter Root valley, or have a mean of 19.50. Even when crossed by Lieutenant Grover, while the cold northeast wind was blowing, we find that its temperature was more than a degree higher than it should have been when compared with Fort Benton.

From the increasing altitude and width of the Rocky mountain plateau, towards the south we find that the length of country, having a climate of similar coldness, must be much greater, as traversed by any line of railroad between this and that of the 35th parallel; while there, the distance from the mild winds of the Pacific coast, and the local influences of a much greater extent of snowy mountains, must still further decrease the mean winter temperature. The increased mildness of winter, due to a more southern latitude, is more than compensated by the greater altitude of *any pass* between the two routes; while the same fact is to be seen in relation to any interval of the same length (190 miles) traversed by the routes through those passes.

Of the relations of climate to the agricultural capacities of the country on the route, enough has been given to show that, while inferior to many parts of the United States in its adaptation for great variety of crops, it compares favorably with the best portions of the empire of Russia for the cultivation of the great staples of agriculture, and west of the Rocky mountains far surpasses them, approaching the most productive countries of Europe in character. Compared with any other route north of the 30th parallel, the climate is superior for agriculture. The natural growth of trees among the mountains, on this route alone, proves the superiority of climate over that of the elevated portions of the central Rocky mountains, where there is not sufficient moisture to sustain them, except at a higher elevation, varying from 5,000 to 8,000 feet. There is nothing in the soil of any portion, except the western part of the great plain of the Columbia, which forbids agriculture; and, allowing for mountains, also, the distance traversed through lands, not cultivable continuously, will not exceed 320 as a *maximum*, most of which is grazing land, and contains patches of arable land sufficient for a stock-raising population, and for nuclei for mail and railroad stations.

COLD AS AN OBSTRUCTION TO THE RAILROAD ROUTE.

It is alleged that the weather is so cold on this route that it will be impracticable to work men in the construction of the road for a large portion of the year, and that it will be impracticable to run cars for many days in the winter.

But we have very complete observations on these points, and great lines of railroad in operation over tracts of country as cold, and even colder than the route from Fort Benton to the shores of the Pacific. The following table gives the mean temperatures of the winter of 1853-'54, at stations on the route of the expedition, with comparisons of the same winter, and of the average of many winters on railroad lines in Canada, the United States, and the great Russian line between St. Petersburg and Moscow. It shows also that the coldest part of the route is, in reality, that between the Great Bend of the Missouri and the Mississippi, where the cold is not more severe than at Quebec or Moscow:

Comparison of mean winter temperatures.

Localities.	1853-'54.	Average.	Length of observation and remarks.
	°	°	
Cantonment Stevens	24. 90	-----	
Fort Benton	25. 38	-----	
Fort Owen	-----	30. 30	Winter of 1854-'55.
Fort Snelling	11. 64	16. 10	Mean of 35 years.
Fort Garry	-----	3. 95	Winter of 1855-'56.
Montreal	13. 22	17. 80	Mean of 10 years.
Quebec	11. 03	13. 30	Mean of 10 years.
Moscow	-----	15. 20	Mean of 21 years.
St. Petersburg	-----	18. 10	Mean of 25 years.
Edmonton	-----	-----	1827. January, 11°. 05 ; February, 14°. 32.
Albany	24. 33	26. 00	Mean of 28 years.
Salt Lake City	35. 30	32. 10	Mean of 2 years.
Fort Laramie	30. 90	31. 10	Mean of 6 years.
Fort Kearney	25. 96	23. 04	Mean of 6 years.
Boston	26. 20	28. 40	Mean of 36 years.
Milwaukie	21. 6	26. 0	Mean of 3 years.
Buffalo	26. 7	26. 0	Mean of 3 years.
Fort Pierre	-----	15. 9	3 winters—in 1854-'55, 24°. 60 ; in 1856-'57, 9°. 90.
Fort Clark	-----	13. 2	1833-'34.

Thus, in the winter of 1853-'54, an unusually cold one throughout the northern States and Territories, the climate at Fort Benton was 12° warmer than at Montreal, 14° warmer than at Quebec or Fort Snelling, 10° warmer than at Moscow, and 7° warmer than at St. Petersburg. In the Bitter Root valley the difference was $0^{\circ}\frac{4.8}{100}$ less, but in the following winter $4^{\circ}\frac{20}{100}$ greater, which is no doubt nearer the mean winter climate.

Comparing now the greatest cold observed, we find that in January, 1854, the coldest days at Fort Benton and Cantonment Stevens were from 6° to 8° milder than at Fort Snelling or Montreal, and the same fact would be undoubtedly true of the great Russian route, although records are not attainable, and from the great distance of the places might not be comparable for the same winters.

Comparison of greatest cold observed.

Locality.	1854.		Other years and remarks.
	o		
Cantonment Stevens	— 29		January 19.
Fort Owens		+1.50	February 20, 1855.
Fort Benton	27		January 14.
Salt Lake City	14		January 24.
Fort Laramie	21		January 20.
Fort Kearney	16		January 20.
Fort Snelling	36		January 21, coldest month in 10 years
Fort Garry		— 48	December 24, 1855.
Montreal	34		January 29, — 36° in 1822.
Quebec	29		January 29.
Albany	10	— 23	January, 1840.
Boston	— 6		January 29, (1855, February 7, — 16°.)
Edmonton			1827. January, — 27°; February, — 25°.

Considering the subject now in another point of view, I take the number of cold days when the average temperature was below zero. It thus appears that there were more such days on the Grand Trunk line and the railroad lines in Minnesota than in the Rocky mountains.

Number of winter days when the thermometer averaged below zero.

Locality.	1853-'54.	Other winters and remarks.
Cantonment Stevens	10	January.
Fort Owen		None in 1854-'55.
Fort Benton	12	January.
Salt Lake City	2	January 20 and 21.
Fort Laramie		
Fort Kearney	4	January.
Fort Snelling	18	
Fort Garry		53° in 1855-'56.
Montreal	18	
Quebec	23	
Albany		
Boston		February 6, 1855, 7. 7.

The next table, showing the number of cold days during three winter months, when the thermometer averaged above the freezing point, is still more favorable, showing that the number was even greater at Cantonment Stevens than at Albany or Boston, while far more than at the Canadian stations.

Number of days in the winter months when the thermometer averaged above 32°.

Locality.	1853-'54.	Other winters, and remarks.
Cantonment Stevens	32	
Fort Owen		46 in 1854-'55.
Fort Benton	43	
Salt Lake City	34	
Fort Laramie	51	
Fort Kearney	47	
Fort Snelling	6	
Fort Garry		None in 1855-'56.
Montreal	8	
Quebec	5	
Albany	18	
Boston	31	

But it may be objected that the temperature of Fort Benton and Cantonment Stevens is not the measure of the temperature of the intermediate rocky range through which the route passes, and which is much more elevated. Fortunately, the party of Lieutenant Grover made observations of temperature on the route, and it has been found by careful comparisons that the party made the passage during the extreme cold weather of that winter, so that the temperature then observed gives the *extreme* cold of the pass, and not the usual cold. A very intelligent young man who accompanied Lieutenant Grover to Fort Benton returned immediately, and found the weather very mild and pleasant in the pass, corresponding to the observed temperatures at Fort Benton and Cantonment Stevens.

The following tables show the temperatures *as observed* by Lieutenant Grover in the pass, and at the stations on each side of it, during eleven of the coldest days in January, 1854, with a comparison of these with the corresponding coldest days at other points.

Comparison of the eleven coldest days of January, 1854, at the following places :

Date.	Cadotte's Pass. Sunrise, noon, and sunset.	Cant. Stevens. Lat. 46° 30'; 7 and 9 a. m., 2 and 7 p. m.	Fort Benton. Lat. 47° 20'; 7 a. m., 2 and 9 p. m.	Salt Lake City. Sunrise and noon.*	Fort Kearney. 7 a. m., 2 and 9 p. m.	Fort Snelling. Lat. 45°; 7 a. m., 2 and 9 p. m.	Montreal.	Quebec. †
January 12	-18	+21.3	-10.3	.....	+ 7.0	.....	.....	.....
13	-22	+ 5.7	-13.3	.....	+ 9.0	.....	.....	.....
14	-19	- 4.3	-18	.....	- 1.0	- 4.0	.....	.....
15	-18	- 7.3	- 8.3	.....	+ 0.50	- 1.5	.....	.....
16	-20	- 8	0	.....	+ 7.0	-12.0	.....	.....
17	- 0.3	- 5.3	- 5	.....	+ 8.50	- 6.0	.....	.....
18	- 9	- 1.5	-15	.....	+ 1.0	+ 2.0	.....	.....
19	-13	-16	-18	+15.7	-11.0	-10.2	+ 5.6	.....
20	-10	- 7.8	+ 5.3	0.0	+ 4.50	+ 2.0	+10.5	+ 3.5
21	+ 6	+ 7.5	-10.7	0.3	- 3.50	-23.5	+11.3	+ 7.8
22	+ 4	.....	+12.7	+10.0	+10.50	-24.5	- 6.9	-13.3
23	.....	.....	.....	+18.6	.....	- 9.0	- 3.1	+12.0
24	.....	.....	.....	+25.0	.....	-18.0	+ 2.2	- 5.5
25	.....	.....	.....	+36.0	.....	.....	+ 0.6	- 8.9
26	.....	.....	.....	+19.0	.....	.....	+ 7.1	-13.2
27	.....	.....	.....	+18.0	.....	.....	-11.0	+ 2.5
28	.....	.....	.....	+19.0	.....	.....	-19.1	+ 7.0
29	.....	.....	.....	+20.0	.....	.....	- 0.9	-11.4
30	.....	.....	.....	.....	.....	.....	.....	-16.1
Mean....	-10.1	- 5.2	- 7.3	+16.5	+ 3.04	- 9.5	- 0.33	- 2.0

13th to 24th.—Pembina..... -17.7 | 16th to 25th.—Rochester..... +21.8

* Approximate from observations at sunrise and noon.

† Same days as at Montreal.

Comparison of ten days preceding these on eastern slope of Rocky mountains with similar periods at other places.

Date.	E. of mountains.	Cant. Stevens.	Fort Benton.	Salt Lake City.*	Fort Kearney.	Fort Snelling.	Montreal.	Quebec.
January 2	+51.5	.....	+51.7	.....	+46	.....	.....	.....
3	+12.6	+34	+11.3	.....	+40	.....	.....	.....
4	-12.6	- 0.8	-10.7	.....	+18	+ 3.0	.....	.....
5	-33	- 8.2	0.0	.....	- 2.5	- 6.0	.....	.....
6	+19.0	.....	+18.0	.....	+ 3.5	- 6.0	.....	.....
7	+31.6	.....	+34.3	.....	+16.5	+ 1.0	.....	.....
8	+44.3	+33	+46.7	.....	+31.5	+ 2.0	.....	.....
9	+30.3	+37.7	+43.7	+30	+31.5	+21.6	- 8.50	- 9.6
10	+26.6	.....	+37.7	+34	+34	+19.0	- 4.16	- 7.1
11	+32.0	.....	+28.3	+29	+26.5	+13	+10.46	+13.3
12	.....	.....	.....	+ 3.5	.....	-18.5	+36.83	+26.1
13	.....	.....	.....	+40	.....	+ 2.0	+35.36	+35.2
14	.....	.....	.....	+42	.....	.....	+13.86	+18.1
15	.....	.....	.....	+26	.....	.....	+ 3.66	+ 3.1
16	.....	.....	.....	+22.5	.....	.....	+14.50	+ 8.7
17	.....	.....	.....	+29	.....	.....	+ 3.03	+16.5
18	.....	.....	.....	+20.5	.....	.....	+ 3.56	+ 3.5
Mean ...	+23.1	.....	+26.1	+30.8	+24.5	+ 3.05	+10.86	+10.78

3d to 12th.—Pembina; lat. 49°.... + 5.0 | 4th to 16th.—Rochester..... + 30.4 | 4th to 13th.—Madison, Wis.... + 17.5

* Mean of observation at sunrise and noon.

From these data a good estimate may be formed of the temperatures of the mountain passes between each set of posts of observation, by allowing 3° decrease of temperature for each 1,000 feet elevation, as estimated by Professor Henry, of the Smithsonian Institution. From this calculation the following table is constructed:

Fort Benton.	Distance to—	Cadotte's Pass.	Distance to—	Bitter Root valley.	Comparison on route by Cadotte's and South Passes.	Fort Laramie.	Distance to—	Bear River mountains.	Distance to—	Fort Hall, winter 1849 and 1850.
<i>Feet.</i>	<i>Miles.</i>	<i>Feet.</i>	<i>Miles.</i>	<i>Feet.</i>		<i>Feet.</i>	<i>Miles.</i>	<i>Feet.</i>	<i>Miles.</i>	<i>Feet.</i>
2,900	95	6,044	95	3,500	Altitude	4,500	330	8,000	95	4,500
○		○		○		○		○		○
25.0	-----	17.0	-----	27.0	Winter temperatures of 1853 and 1854...	30.2	-----	15.1	-----	23.0

In the latter case the interval between the two posts, which exceeds 6,000 feet in altitude, is over two hundred miles, all of which would have a winter temperature ranging between $15^{\circ}.1$ and $23^{\circ}.5$.

On the other hand, only 165 miles on the northern route exceed 3,000 feet in altitude, having a winter temperature between $17^{\circ}.0$ and $26^{\circ}.0$, and only six miles exceed 5,000 feet.

The two coldest days in January, 1854, furnish a good evidence of the general correctness of the rule followed, as here shown:

Date.	Cadotte's Pass.	Fort Benton.	Difference.	Wind.
	Sunrise, noon, and sunset.	7 a. m., 2 and 9 p. m.		
1854.	○	○	○	
January 12	18	10.3	7.7	N.ENW.
13	22	13.3	8.7	NE.

SNOW AS AN OBSTRUCTION TO THE RAILROAD LINE.

Details of the information in regard to snows in the Cascade mountains are given in Volume I, and more recent observations do not show any probability of their being under-estimated. The great mildness of the winters must affect the temperature of the passes sufficiently to prevent the constant accumulation of snow for more than one winter month, while rains frequently take their place. Compared with Steilacoom, where the mean winter temperature is $39^{\circ}.5$, that of Snoqualme Pass should be at least 29° , while for much of the time it would rise above the freezing point and cause thaws or rain. It has already been shown that the difference of 3° for each 1,000 feet was too great, as determined by actual observation of the coldest days of January, 1854, at Fort Benton and Cadotte's Pass; and the great rarity of cold northeast winds, as we approach the Pacific coast, must make the difference there still less than in the Rocky

mountains. The difference which would be expected from this rate of decrease of temperature is $9^{\circ}.3$, showing that, even when the wind blows from the coldest quarter, less cold was produced than is usual in places having the same relative altitude above the sea. And as the westerly winds are most prevalent, the difference between the climate of the pass and Bitter Root valley must usually be even much less.

It has been found that some snow usually exists in the Nachess Pass from November to May; but that being 1,424 feet higher than the Snoqualme, a month may safely be allowed as the difference in the Snoqualme Pass, while the period during which more than five feet lies in the highest part of it (ten miles, over 2,000 feet) may be reduced to a month.

In calculating the probable amount of snow which fell in the Snoqualme Pass in the winter of 1853-'54, the mean temperature of *that* winter should be used instead of the mean of *four* winters, since there is a marked difference between them—that of 1853-'54 being $1^{\circ}\frac{2.2}{10.0}$ colder than the average, and $4^{\circ}\frac{4}{10}$ colder than two winters in six since 1849, and only $1^{\circ}\frac{2.0}{10.0}$ warmer than the coldest.

Using the recorded temperature at Fort Steilacoom for 1853-54, we find that November, 1852, was only $0^{\circ}\frac{4.8}{10.0}$ higher than that of December; therefore, if snow fell in December it must also have fallen in November. And in this month there was $18\frac{4.1}{10.0}$ inches of rain at Steilacoom, while only $20\frac{6.8}{10.0}$ fell in the three following months. This would give for three months preceding Mr. Tinkham's journey across the pass in February $26\frac{1.5}{10.0}$, (adding November to Captain Humphrey's estimate,) and $12\frac{9.6}{10.0}$ afterwards. By the rule of allowing twelve times the bulk of the rain for snow, Mr. Tinkham should have found twenty-six feet, whereas he found only six; showing that *either* $7\frac{2}{10}$ inches only of moisture had fallen, or that most of it (over three-fourths) fell as rain. Admitting that the whole which fell after his crossing was in the form of snow, there would be $12\frac{9.6}{10.0}$ feet more; but this would be absurd, since February was nearly 10° warmer than January, and there was $1\frac{1.2}{10.0}$ less rain at Steilacoom; taking the same proportion as for the preceding three months, viz: $\frac{3}{13}$, making three feet to be added—in all, nine feet for the winter. But as the temperature of March was $0^{\circ}\frac{7.5}{10.0}$ colder than December, we must admit that two-fifths of the moisture of that month was also deposited as snow; and then $2\frac{8.9}{10.0}$ inches of rain at Steilacoom would give us $+ \frac{6.6}{10.0}$ feet more of snow to be added, making $9\frac{6.6}{10.0}$ feet from November 1 to April 1.

If November is omitted, so must be December; and then the moisture which fell before the 21st of January at Steilacoom, $3\frac{3.2}{10.0}$ inches $+ 12$, would give $3\frac{3.2}{10.0}$ feet of snow, while Mr. Tinkham found six feet. Therefore, November and December must be included. Besides, Lieutenant Mowry states that snow falls in these mountains in November, and Lieutenant Hodges actually met with a slight fall in the Nachess Pass in September.

Here we see, too, the necessity of taking into the account the loss by evaporation, thawing, and condensation, which goes on even in the coldest weather of the arctic winter.

Supposing this to account for the difference of the calculated and observed fall from November 1 to January 21, and admitting the fall from January 21 to April 1 to be three feet, added to the six feet found by Mr. Tinkham, there would remain on the ground at the latter date only two feet. This would be much further decreased by the greater amount of thawing in the two warmer months following January.

Or, by another process, we find that the difference between 39 feet, ($26 + 13$), the amount calculated by the rains of Steilacoom and the true amount, would be in the same proportion as that between the amount predicated on the rains previous to January 21 and the actual depth

found by Mr. Tinkham, or as $26 : 6 :: 39 : 9$; thus showing that the whole amount falling in the five months does not probably exceed nine feet, and this can only remain during the coldest weather—since the *mean* for December and January is, at the height of Snoqualme Pass, only four degrees below freezing.

It is not probable that as much moisture is deposited in the pass as at the sound. It is at a greater distance from the sea. And in consequence also of its great elevation there would be a rarefaction and coldness in the atmosphere which would tend to make it less humid. It is a fact, ascertained by experiment, that in the same storm rain-gauges near the surface of the ground are made fuller than others at a few hundred feet elevation directly above them, showing probably that the drops of rain must increase in size as they descend, by accumulating moisture.

The western spurs of the Cascade range must intercept much of the snow (or moisture) before it reaches the pass; and if we should admit the hypothesis that the amount of moisture falling in the pass is the same as at the sound, we must also admit that the same amount falls on the plains east of the mountains, contrary to actual observation.

The depth found in February, by Lieutenant Grover, along Clark's Fork, two and one-half feet, would be produced by two and one-half inches of moisture; and it is stated expressly by him that there was *none* on the plains from Spokane river southward, while *east* of the Bitter Root range none was seen by him or by Lieutenant Mullan over a foot in depth.

Snow lines, at a height of twenty-five feet, on trees are produced by drifts lodging against them, and the Indians walking over the surface on snow-shoes would be unable to determine whether the snow was drifted on a surface everywhere uneven and remote from their winter homes where they are acquainted with the ground. Hence probably arose the information derived from them, that the depth of snow was usually so great.

The presence of the evergreen spruce and pine timber prevents thawing, and thus assists in the accumulation of drift upon drift, while the effect to be expected from opening the surface to the sun may be estimated by the fact that, as just stated, Lieutenant Grover found *no* snow on the Spokane prairie, while just before he came out of the timber there was a depth of two feet.

The whole evidence favors the belief that there is not a greater depth of snow in the highest six miles of the pass than on the line of the Portland and Montreal railroad, and that it passes off about as early, while the rest of the route is *never* liable to be impeded by snow.

On no other point of the route between the Mississippi and the Cascade mountains is the precipitation of snow as great as in this interval. At Fort Snelling, admitting that all the moisture of the three winter months should fall in the form of snow, we find that the *maximum* of nineteen years' observations is only 5.47 inches melted, or 54.70 inches snow, ($4\frac{1}{2}$ feet,) and the *minimum* $\frac{1}{2}$ an inch of snow. The mean for the same period is only 19.20 inches. Going westward, the deposition rapidly decreases until approaching the Rocky mountains, where the influence of the west winds probably causes an increase, but at the same time mostly in the form of rain. Mr. Doty records: "December, 1853, no snow or rain during this month;" in January $7\frac{1}{2}$ inches, (1.6 inches moisture;) February, including both snow and rain, 11 inches, (3.4 inches,) none of which remained long on the ground. On the Great Plain of the Columbia Lieutenant Grover found *no snow* in the end of February, although the accumulated snows of the winter were $2\frac{1}{2}$ feet deep in the woods along Clark's Fork, the deepest he met with. The mildness of the winters, compared with Fort Snelling, will not permit us to make the same

estimate from the amount of moisture in winter as we have done there, especially since we find that at Fort Benton, with a winter 5° colder than on the Great Plain, the proportion of snow to moisture was only 18.5 to 5 inches, while at Fort Snelling we allow 50 to 5 inches.

The register of rain and snow at Fort Benton for one year, although imperfect, still shows the less moisture is there deposited than at Fort Laramie; and although the amount is much greater west of the Rocky mountain divide, as shown by the comparison of the number of days in which rain or snow fell at Cantonment Stevens, yet none of the parties who traversed that part of the route in any winter month found snow enough to interfere with a railroad.

OBSERVATIONS ON THE ISOTHERMAL CHART.

The isothermal lines east of the Mississippi are copied from Blodgett's Climatology of the United States, published in 1857. These do not differ much at the sea level from those determined by the Smithsonian, and published in the Patent Office Agricultural Report for 1856, but are curved on the land to conform generally with the undulations of the surface, their correctness being tested by numerous and long continued observations at fixed points, by which the local influences, independent of latitude and altitude, may be considered pretty well established.

The direction of these lines west of the Mississippi and north of latitude 50° have been determined partly from the same and partly from data additional to those used by Mr. Blodgett, and they are found to vary so much from his conclusions that a statement and discussion of them is rendered necessary.

1. *Red River of the North.*—Mr. Blodgett gives in his table of statistics only seven months' observations at Pembina, latitude 49° , and at such irregular intervals that only part of them can be used for computing the means for spring and summer. A year's observations at Fort Garry, latitude $50^{\circ} 15'$, near the mouth of the river, are used in this computation, showing a difference of about four degrees for the two places at corresponding seasons, which, being about that due to latitude in this region, makes the mean for winter reliable as the true winter climate of the place. The following table shows the comparative results thus obtained:

	Latitude.	Longitude.	Altitude.	Spring.	Summer.	Autumn.	Winter.	Year.	Mean.
	° '	° '	Feet.	°	°	°	°	°	
Fort Snelling	44 53	93 10	820	45.6	70.6	45.9	16.1	44.6	35½ years.
Fort Ripley	46 19	94 19	1,130	39.3	64.9	42.9	10.0	39.3	6 years.
Pembina	48 56	97 00	900	34.3	71.7	-----	-----	-----	7 months.
Fort Garry	50 15	97 00	860	35.79	67.76	40.83	6.85	39.81	1855'-56.

The lower altitude would account for the mean annual difference being in favor of Fort Garry over Fort Ripley, even supposing that the summer temperature is not too great, which it may very possibly be from local circumstances.

The table for Fort Garry is copied from the "report of the exploration of the country between Lake Superior and the Red River settlement," Toronto, 1858.

The next points in the lines in which alteration was found necessary are those where the isothermo for winter (isochimenes) strike the Missouri between the mouth of the Platte and Fort Union. The materials at Mr. Blodgett's command were very imperfect for this portion,

and three years' continuous observations at Fort Pierre, with one also at Fort Randall, furnish much more reliable data. The mean results for winter are given in the table below.*

	Latitude.	Longitude.	Altitude.	1854-'55.	1855-'56.	1856-'57.	Mean.	Remarks.
	° ' "	° ' "	Feet.	°	°	°	°	
Fort Kearney	40 38	98 57	2,360	33.13	13.73	14.8	23.04	6½ years' observations.
Fort Randall	43 01	98 12	-----	-----	-----	9.03	-----	
Fort Pierre	44 23	100 12	1,660	24.60	13.10	9.90	15.86	3 years' observations.
Fort Clark	47 00	100 45	1,876	-----	-----	-----	-----	13.20, winter, 1833-'34.
Fort Union	48 00	104 00	2,022	-----	-----	-----	-----	19.4, Jan., Feb., 1833.
Fort Snelling	44 53	93 10	820	16.79	9.09	7.55	16.07	35½ years' observations.

A comparison of these winters is made with those at the nearest points where long series have been obtained, from which it appears that the mean of the three winters at Fort Pierre is probably near the true mean, since the same winters at Fort Kearney vary only 0.60 from that of six years at that post, although each separately varies widely.

But the observations at Forts Clark and Union in 1822-'23, are not so easily reconciled. The same years observed at Fort Snelling, the nearest post, show that entirely different climatic conditions affect the three places.

	January, 1822.	February, 1822.
Fort Snelling	17.16	6.46
Fort Union	21.30	17.50
	Winter, 1833-'34.	Mean of 35 winters.
Fort Snelling	22.72	16.07
Fort Clark	13.20	-----

The only conclusion from the comparison is, that Fort Union partakes of the milder winter climate of the western coast, as observed still more strikingly at Fort Benton. Forts Kearney and Laramie occupy a similar relation to each other and to the Pacific climates, and the long series at those posts show that the former has a winter temperature 7°.10 colder than the latter, while the periodical curves follow nearly the same course, keeping from four to ten degrees below. A similar relation of climate may be expected to prevail between Forts Union and Benton. But Fort Clark shows two winter months much colder than for the same period at Fort Snelling, which, together, were 3°.85 below the average of thirty-five years. This, together with the great differences in the three winters observed at Fort Pierre, favor the conclusion that this portion of the Missouri lies intermediate between the two systems of climate (for winter) east and west of it, and that the prevalence of winds from either quarter determines the character of the weather. Both extremes seem to be represented by the Fort

* Mr. Blodgett's book gives the isochimenal line for this part of the Missouri five degrees higher than he had fixed it in the charts of the Surgeon General's Meteorological Register of 1855, but he does not give any data for the change, and the former appears most correct.

Pierre series, and the difference of latitude and elevation would show that the winter of 1833-'34 was somewhat below the average for Fort Clark, even supposing it to be influenced less than Fort Union by the western climatic characteristics which probably reach it to some extent.

The late surveys of Lieutenant Warren, in Nebraska, demonstrate that a large portion of the country put down as "Arid Plains" in Mr. Blodgett's charts is really occupied by the "Black Hills," a tract of mountainous country well wooded with pine forests on its higher parts, and many portions of it tillable.

The influence of correction can be scarcely estimated without further exploration of the country west of it, but it may be supposed to be very considerable. The greater cold of the winters at Forts Clark and Pierre may be accounted for, both by the fact that the hills favoring the precipitation of more snow and intercepting the mild westerly winds, which, having here a much wider and higher tract of mountains to cross than they have either to the north or the south, naturally permit a more free scope to the cold winds from the northeast.

If the isochimenal lines of 20° and 25° are to be connected at all between the Mississippi and the Upper Missouri, they must run west of these Black Hills across a low tract of country supposed to exist there, but which is yet quite unexplored.

The chart for winter in the Surgeon General's Meteorological Register appears to express much more nearly the direction of these lines, as determined by the latest observations, than those given by Mr. Blodgett himself.

The temperature, both of Fort Kearney and Fort Riley, appear too high for winter, and the observations of three additional years lower them both considerably. Forts Benton and Laramie hold a similar position in relation to each other, and seem to be wholly influenced by the climate of the western part of the continent. The following table shows their correspondence, and is not altered by the data used by the Surgeon General and Mr. Blodgett. The intervention of a wide tract of unexplored mountainous country makes it impossible to connect the lines, with any approach to certainty, between these posts and those towards the east.

Means for 1853-'54.	Lat.	Long.	Alt.	Spr.	Sum.	Aut.	Win.	Year.	Mean.	Remarks.
At Fort Benton	47.49	110.36	2,900	49.9	72.8	44.5	25.4	48.2	.....	One year's observations.
At Fort Laramie.....	42.12	104.47	4,519	49.1	73.1	50.8	30.2	50.8	50.1	Six years' observations.

The winter of 1853-'54, at Fort Laramie, was below the mean, and the same may be assumed of that at Fort Benton—an assumption which is supported by the results of the observations during the following winter at Fort Owen, alluded to hereafter. Thus the mean winter temperature at Fort Laramie, for six years, was $31^{\circ} 14'$.

The next points westward which admit of comparison are Fort Owen and Cantonment Stevens, both in Bitter Root valley, and only fourteen miles apart, with Fort Hall, on Snake river, and Salt Lake City. It must be remarked that the only winter observed at Fort Hall (1849-'50) seems to have been unusually cold at Fort Laramie, the nearest point recorded, and two degrees may be allowed as the true correction for the mean winters at that place. This is not, however, made in this table.

Means for 1853-'54-'55.	Lat.	Long.	Alt.	Spr.	Sum.	Aut.	Win.	Year.	Mean, &c.
Cantonment Stevens.....	46.20	113.55	3,420	48.0	69.6	45.6	24.9	47.2	1853-'54 } 1854-'55 } mean for winter, 27.06.
Fort Owen.....	46.35	113.55	3,284	.....	.....	.....	30.30	.....	
Fort Hall.....	43.04	112.27	4,500	.....	.....	47.4	23.6	.....	Winter, 1849-'50.
Salt Lake City.....	40.46	112.06	4,351	51.7	75.9	.....	35.30	.....	Winter, two years, 32°.1.

There seem to be no data to warrant the extension of summer temperature of 70° much north of the Missouri river, as has been done by Mr. Blodgett in his last work, and it is accordingly made to run near the "côteau" north of that river, which rises several hundred feet above it, forming the ridge between it and the Saskatchewan. On the other hand, west of the mountains, the line of 70° is substituted for 65° for Bitter Root valley, the prairies near Flat-head lake, and thence down the valley of Clark's Fork and the Columbia, from Fort Colville south. The rapidly decreasing altitude compensates for the greater distance north of part of this tract; but allowance should be made, in some places, for the local influence of surrounding mountains and forests.

The whole of the Great Plain, and the unwooded hills and valleys north and west of the Great Bend of the Columbia, are assumed to have a mean summer temperature above 70° , which is partly proved by a comparison of temperatures on the same days at Fort Dalles and in the Yakima valley.

A series of observations at Fort Walla-Walla, twenty-nine and a half miles east of the Columbia, at the confluence of the Walla-Walla with that river, altitude 1,396 feet, shows that the lowest parts of the plain have a summer temperature as high as 73° , and a line has been drawn to approximately include this district.

The following are the means of observations at this post, (uncorrected:)

Fort Walla-Walla, 1857-'58.—Summer, 73.06; winter, 34.11; autumn, 52.59; spring, 51.85. The winter, compared with the mean for four winters at Lapurai, on the Kooskooskia, and five at Fort Dalles, appears a little below the average for the latitude and elevation.

From the two former records the mean for the Great Plain is assumed as above 35° in winter, though records at Fort Colville are wanting to complete the curve, and the northern parts of the region included may be a little colder.

25° is retained as the mean for the Bitter Root valley, although the second winter's observations, as already shown, raises it to 27.6. The lines of 65° , 60° , and 20° are approximately located, by allowing 3° for each 1,000 feet, at points whose elevation is known, and then connecting them.

There is too little known of the geography of Oregon to make a safe connexion between the known points in Washington Territory and Utah.

No records for any point, except the Dalles, exist from which the summer lines can be projected in the interior of Oregon, and too few altitudes are known to make even an approximation by reduction from better known regions.

West of the Cascades and Sierra Nevada the lines are drawn from the same data recorded in Mr. Blodgett's book, but altered to conform more closely to the surface of the country. The fixed points at which they were taken being usually in valleys, or on the low land along the coast, with high mountain ranges intervening. The lines are made to include only so much of the country around each post of observation as, from elevation and surrounding circumstances, can be considered as having a similar climate.

Fort Jones, the only very elevated post, (2,570 feet altitude,) when compared with Oregon City or Vancouver, both north of it, shows the influence of local situation on climate, and the impossibility of connecting the isothermal lines naturally in so undulating a country.

The following table gives a comparison of the mean temperatures on a line of stations between latitude 46° and 48° , from the mouth of the St. Lawrence to Puget Sound, those points being selected which are nearest the great route of travel by the St. Lawrence, the lakes, and the

proposed railroad route across the continent.—(*From Blodgett's Climatology, excepting the 6th, 11th, and 13th stations.*)

Station.	Latitude.	Longitude.	Altitude.	No. of trs.	Spring.	Summer.	Autumn.	Winter.	Year.	Authority, &c.
St. John's, Newfoundland.....	47 33	53 43	140	5	32.3	51.0	42.8	23.2	38.3	Templeman, Am. Jour. Sc.
Quebec, C. E.....	46 49	71 16	300	10	38.6	65.3	44.0	13.3	40.3	Dr. Sparks, Latour, Mp.
Fort Brady, Mich.....	46 30	84 33	600	31	37.6	62.0	43.5	18.3	40.4	U. S. A. Met. Register.
Fort Wilkins, Wis.....	47 30	88 00	620	2	38.5	60.8	43.0	21.8	41.0	Do.
Fort Ripley, Min.....	46 19	94 19	1,130	6	39.3	64.9	42.9	10.0	39.3	Do.
Fort Garry, Red river.....	50 15	96 00	850?	1	35.79	67.76	40.88	6.85	34.38	Rept. Expl. Red river, 1858.
Fort Clarke, Neb.....	47 00	100 45	1,600?	5-12	.....	.....	.....	13.2	.....	Prince Maximilian.
Fort Union, Neb.....	48 06	104 00	2,019	9-12	44.1	70.1	.....	.....	.....	Do.
Fort Benton, Neb.....	47 50	110 36	2,652	1	49.9	72.8	44.5	25.4	48.2	Doty, N. P. R. R. Exp.
Cantonment Stevens, W. T.....	46 20	113 55	3,412	1	48.0	69.6	45.6	24.9	47.2	Burr, N. P. R. R. Exp.
Bitter Root valley, W. T.....	46 20	113 55	3,400	1½	47.0	69.6	45.5	27.6	47.4	Do.
Lapwai, W. T.....	46 27	117 00	1,000?	2½	51.0	70.3	51.2	36.9	52.4	Spalding, Wilkes' Expl. Exp.
Fort Walla-Walla, W. T.....	46 03	118 25	600?	1½	51.85	73.06	53.57	34.11	55.15	U. S. Army, M. R.
Fort Dalles, W. T.	45 36	120 55	300?	3½	53.0	70.3	52.2	35.6	52.8	Do.
Vancouver, W. T.	45 40	122 30	50	6	51.9	65.6	53.5	39.5	52.7	Do.
Astoria, O. T.....	46 11	123 48	50	12-12	51.1	61.6	53.7	42.4	52.2	Do.
Steilacoom, W. T.....	47 10	122 25	200?	5½	49.2	62.9	51.7	39.5	50.8	Do.

CHAPTER V.

RAILROAD REPORT AND ESTIMATE.

ST. PAUL TO BOIS DES SIOUX.—BOIS DES SIOUX TO FORT UNION.—FORT UNION TO CROSSING OF MILK RIVER.—CROSSING OF MILK RIVER TO FORT BENTON.—FORT BENTON TO ENTRANCE TO TUNNEL, CADOTTE'S PASS.—HELL-GATE CROSSING, VIA CLARK'S FORK, TO THE SPOKANE.—HELL-GATE CROSSING TO CROSSING OF BITTER ROOT.—CROSSING OF BITTER ROOT TO ENTRANCE TO TUNNEL THROUGH THE CŒUR D'ALENE MOUNTAINS.—TUNNEL AT THE CŒUR D'ALENE MOUNTAINS.—TUNNEL TO CŒUR D'ALENE MISSION.—CŒUR D'ALENE MISSION TO THE CROSSING OF COLUMBIA.—CROSSING FROM THE COLUMBIA TO SEATTLE, ON PUGET SOUND.—ESTIMATE OF COST.

ST. PAUL TO BOIS DES SIOUX.

The Mississippi, at St. Paul, flows some hundred and fifty feet below the higher prairies east of the town. The ascent to this plateau is made with a forty foot grade; then, with little variation of surface or soil, the line follows the general direction of the river, passing over prairies or oak openings to Sauk Rapids, and thence to Little Falls, 112 miles. The same characteristics to Crow Wing.

In this interval the soil generally consists of a vegetable mould, of from one to four feet in depth, resting on a gravelly or sandy substratum, affording the best material for a fine and dry road embankment. On the right, and further towards the interior, is the heavily wooded and timber country of Minnesota. No rock cutting was observed, though rock was found in places near St. Anthony's Falls, and in the vicinity of Sauk Rapids. The grades are light, seldom exceeding two feet per mile. The bridge crossings are, at Rice creek, 60 feet; Coon creek, 60 feet; Rum river, 150 feet; Elk river, 120 feet. The culvert masonry is small, and the earth-work will not exceed an average embankment of six feet. For structures both of wood and stone the material is good, and near at hand. The crossing at Little Falls requires but 325 feet of bridge, in two stretches, the river being divided by an island. The river is crossed at right angles. The abutment rests on a rock, and being at the falls, the bridge presents no obstruction to navigation.

Here the crossing affords a good connexion with a line from Lake Superior, and on the west side enters a better wooded country than that further south, and one probably adapted for a firmer and drier road-bed.

Crow Wing has also great advantages for a connexion with Lake Superior, in the facility with which a bridge can be thrown across the river at that point, and the easy and very fertile character of the country, both eastward to Lake Superior and westward to the Bois des Sioux, on its inexhaustible terraces, and in the saving of distance on the crossings to the south.

The crossings at St. Anthony's Falls and the Sauk Rapids are respectively of 800 and 600 feet, both feasible, and giving fair facilities.

In the next hundred and twenty-eight miles to the Bois des Sioux prairie the line passes successively through wooded and prairie country, the rise in this interval being about three hundred feet, the ground rolling, sometimes showing stony and gravelly knolls, and frequently interrupted by small lakes. The earth-work in this portion will not exceed an average embankment of eight feet high, and is occasionally stony. Granite boulders, at occasional

intervals, are scattered over the surface. Side ditching is often necessary in flat and low places, but for the main part of the distance the excavation is high and gravelly. There is no rock excavation. Grades of thirty feet per mile will occasionally be required in the limited region of knolly, rolling country, but will not generally exceed ten feet. Crossing the tributaries of the Minnesota at their sources, the amount of bridging will be small; an estimate of two hundred feet on the small streams of the Crow, South Branch, and Chippewa rivers covers the whole. The culverts will be frequent, but small. The pine and wooded region is estimated to extend on this line eighty miles westward from the Mississippi. From this the supplies of timber will be mostly drawn.

Stone is found in places only at the Mississippi. Granite boulders, which will supply culvert masonry, are found some sixty miles west of the Mississippi. For the small amounts of bridge abutments stone must be brought from the Mississippi, unless good materials are hereafter found more convenient.

The Bois des Sioux will require a bridge of one hundred and forty feet; thence forward to the Missouri the distance is miles, and the total rise is about seven hundred feet. The first part of this is over the plateau of the Bois des Sioux.

BOIS DES SIOUX TO FORT UNION.

The line westward from the Bois des Sioux passes south of the Shaysenne and avoids the difficult crossing of that river, referred to in the narrative. In the breaking up of the winter, and with the spring rains, the plateau of the Bois des Sioux is undoubtedly very wet and marshy, and to a great extent covered by a small depth of standing water. The Wild Rice river, and a branch of it which also runs through this plain, will require bridges of one hundred and twenty and one hundred feet. From south of the Shaysenne to Mouse river the country is nearly uniform, gradually rising, in part undulating, but frequently marshy, and with many small lakes. James river is crossed by a bridge one hundred and twenty feet in length. There is a general destitution of wood throughout this interval. The Bois des Sioux and Wild Rice rivers will furnish a small amount, and the Shaysenne will supply sleepers for two hundred miles of the way, single track. We do not know that James river will furnish any, but wooded lakes occasionally aid in the supply. A supply can be procured from the Miniwakan lake. Mouse river is a large stream of water, and, after the Red River of the North, the most important on the route between the Mississippi and the Missouri. It flows in a deep wide valley, upwards of two hundred feet below the prairie level, the bottom varying from a half mile to two miles; it is wooded, sometimes heavily, with elm, oak, ash, maple, &c. Its high and steep banks are cut up by deep coulees, extending back for fifteen or twenty miles. As these coulees would be difficult to cross, the railroad line is located so as to head them.

At Mouse river a coarse gray sandstone crops out, and near by, at the Maison du Chien, Mr. Lander reports an abundance of excellent building sandstone.

Mouse river is one hundred and twenty feet wide, and apparently as much as seven feet deep. The information collected as to its navigability was, from one source, that there was no obstruction; from another, that one rapid existed in the course down to its junction with Red river. This may be of great service in transporting materials, besides affording access to its beautiful and fertile valley.

Between Mouse river and Fort Union the route crossed the Plateau du Côteau du Missouri, and though by keeping up the River of Lakes to its source, as recommended in the first report,

a somewhat more level and uniform surface is found, with grades not exceeding forty feet per mile. The more direct route travelled by the main train offers no obstructions of consequence. The grading on this route will not exceed fifty feet. The line should strike some point on the Missouri, in the vicinity of the mouth of the Yellowstone, at the head of navigation for the larger class of steamers which can run down the Missouri. This point will be in the general vicinity of Fort Union, and can be reached by the valley of the Little Muddy. At Mouse, Cheyenne, Bois des Sioux, and Wild Rice rivers, but best at Red river, all the materials for good bricks are obtained, and it may be found cheaper and better to use brick masonry in the neighboring bridges and culverts, though the granite boulders will supply a considerable amount. Water can, by reservoir and unimportant aqueducts, be introduced at any point desired, and the numerous small lakes on the route will in this way be of service. Even through salt water regions fresh water ponds are more numerous than those that are brackish. Prairie fires should be provided for by ditching, and as the grass is not generally heavy this will prevent all danger to the road work and trains.

Besides the supply of wood on the rivers and on the Missouri, the road will require supplies to be transported from the forest near the Upper Mississippi. But without this it is estimated that the supply along the line is sufficient for six years. Coal exists in lower Minnesota and Iowa, and an inferior quality was also found on Mouse river.

FORT UNION TO CROSSING OF MILK RIVER.

From Fort Union the line follows up the favorable valley of the Missouri to Milk river $105\frac{3}{10}$ miles, and then up the equally fine valley of Milk river for 180 miles further. The bottom lands of both are composed of clay and sand, of a nature to become soft and sloppy in wet weather, but parched and cracked during the dry season. This section does not offer the best, but will afford a fair material for road embankment. The tributary rivers on the north side, for which bridges must be erected, are the Great Muddy, Poplar, and Porcupine, all small streams with an average width of sixty feet, the greatest depth where crossed, three feet. They will each require eighty feet trusses with two abutments.

There is, besides, one peculiar feature for which provision must be made in constructing a railroad. At short intervals, not over eight miles for the whole river-line, narrow canal-like channels are found, generally extending from the coulées of the bluffs, dry in summer, but in the spring freshets forming the sluices by which the surplus water runs into the river. These have an average width of twenty-five feet, with a depth of eight feet, and should be spanned with a single timber structure to prevent the accumulation of water which would take place if the embankment was filled in across them, and which would in time undermine it. Missouri river in the vicinity of Fort Union is about 450 yards wide, and up to Milk river has a valley from two to eight miles wide. Its banks are well wooded with cotton-wood, and has a small quantity of red cedar. The hills on the south side are rough broken bluffs, from three hundred to five hundred feet high, and on the north side they also rise abruptly, but are low, the plain a few miles back being only from one to three hundred feet above the river. A coarse white sandstone crops out of the bluffs, but apparently will not be of use for building. Here the Yellowstone coming in will aid in supplying timber, and perhaps stone, from the Black Hills and other ranges wooded with pine, which occur some distance up near its course.

The lignite of this region traced from the coulées of Mouse river to the headwaters of Milk, a distance of five hundred miles, apparently underlies this whole district, in a bed varying

from a few inches to six feet thick, and is a source of fuel not to be overlooked. Lime and sand are both to be obtained, and good materials for brick exist. In summer there is a scarcity of water, the small streams being dried up, but from the elevation of the plateau above the valley a good means is afforded for keeping up a supply, with the assistance of reservoirs, in those places at a distance from the main stream.

The rise in level along the Missouri is about one foot, and on Milk river about three feet per mile only.

The cotton-wood of the Missouri will answer, temporarily, for railroad sleepers. The stockade built of it at Fort Union, which does not rest on the ground, is firm and sound, though built over twenty-five years ago. Milk river is crossed in a bend of the stream at right angles to the current, requiring a truss of about two hundred and forty feet, with an abutment twenty feet above the river bottom. The masonry should be protected, by piling, from the wash of the freshets.

CROSSING OF MILK RIVER TO FORT BENTON.

Milk river is crossed about two miles below the mouth of Box Elder creek, and the line passes up its general valley about thirty miles, when a choice of routes may be made. One route passes up a wooded tributary of the Box Elder, thence over a low divide to the Missouri, and follows up the Missouri on its northern bank to Fort Benton. The other ascends the plateau between the Box Elder and the Marias on the general route of the main train in 1853, passes near the spring, descends into the valley of the Marias near its junction with the Teton, continues up the Teton to the point where it approaches within one hundred yards of the Missouri, then passes to the valley of the Missouri, and continues on the route before referred to to Fort Benton. The distance by the first route is eighty-one and one-half miles, and by the second seventy-five and five-tenths miles. The grades up to Box Elder will range from ten to twenty feet. The excavations and embankments will be quite moderate. The several streams, which are from five to ten miles apart, will require bridges of from fifty to seventy-five feet in length. There are also coulées which will require some culvert work. The valley of the Missouri should be struck at the mouth of the stream which flows from the springs, the distance from Box Elder creek to this point being twenty-one miles. About five miles from this point will be the summit of the divide, which, allowing for a cut of fifty feet, will have an elevation of 2,832.2 feet. The altitude of the Missouri is 2,558.5 feet, requiring a grade to meet the Missouri of 54.74 feet to the mile. From the Box Elder to the summit the grade will vary from 45.6 feet to 4.82 feet per mile. Most of this distance is a gently rolling plateau, requiring but little excavations and embankments, but the first four miles from the Box Elder the grade will be 45.65 feet to the mile, with some heavy work. From the mouth of the creek to Fort Benton, a distance of thirty and one-half miles, the grades will be very gentle, not exceeding ten feet to the mile, the whole rise being but 221 feet. In that distance, to avoid sharp curvature, say less than two thousand feet radius, there will be heavy excavations in turning the points which project into the river. The river valley is wide, and will render it perfectly easy to waste earth without interfering with the channel of the river.

The altitude of Milk river is 2,388.8 feet, and of the Box Elder, at the point where the route leaves it, 2,691.7 feet. The other line referred to, passing over the plateau in four miles, makes a height of 2,924.3 feet, when it continues over a gently rolling prairie for 26 miles to the point where the descent commences to the valley of the Marias, the highest point being in the vicinity

of the springs, and having an altitude of 2,982.2 feet. The descent to the Marias involves difficult and costly work, and must be made in $1\frac{1}{2}$ mile along the foot-hills and up the stream, which should be crossed by a bridge 100 feet high, at an altitude of 2,782.9 feet; the altitude of the point whence the descent commences being 2,865.1 feet. The route then continues up the Teton $9\frac{1}{2}$ miles to the Craquon du Nez, with a descending grade of 3.17 feet to the mile. The bluffs of the two sides of the Craquon du Nez are about 100 yards apart, the foot of the bluff in the Teton being 81.5 feet above the foot of the bluff on the Missouri. By commencing, however, a cut before reaching the bluffs, we reach the valley and commence going up the Missouri, with an embankment about 41 feet above the immediate line of the river, but which can be very much reduced by being adjusted along some foot slopes that line the valley. The descent can be made to the valley by a grade not exceeding forty feet to the mile, without heavy excavations or embankments. By either of these routes there will be no difficulty about supplies of water. The Box Elder, its several tributaries, the Missouri, the Marias, and the Teton, will furnish an unfailing supply. The longest distance without water will be on the plateau route, viz: from the Box Elder to the Marias, a distance of 31.5 miles; it is probable, however, that water can be procured by sinking wells near the springs. Either route can be easily supplied with all the materials for construction. The Bear's Paw, near by, as well as the country south of the Missouri, will furnish timber of all kinds. There is good limestone and sandstone in the vicinity of the route; sand for mortar and clay for bricks.

FORT BENTON TO ENTRANCE TO TUNNEL.—CADOTTE'S PASS.

Cadotte's pass may be reached from Fort Benton either by keeping up the valley of the Missouri to the mouth of Sun river, thence up the Sun to a point nearly opposite the Rattlers, thence crossing the Sun between Crown Butte and the Rattlers, and continuing nearly on the course pursued by the main train, or the crossing of the Sun may be made by ascending the plateau from Fort Benton and passing by the springs and prairie lake referred to in the itinerary. The distance by this latter route from Fort Benton to the entrance to the tunnel of Cadotte's pass will be one hundred and two and two-tenths miles. This is four miles longer than the trail pursued in 1853, for I have allowed two miles to make the descent into and the crossing of Sun river, and two miles for that of the Dearborn. The distance from Fort Benton to the crossing of Sun river will be $55\frac{1}{2}$ miles; thence to the Dearborn thirty-six and seven-tenths miles; thence to the entrance to the tunnel ten miles. From Fort Benton to the springs the distance is sixteen and one-fourth miles, to the lake eighteen and a half, and thence to the Sun river twenty and three-fourths.

There will be no difficulty in adjusting grades over this distance not exceeding forty feet to the mile. The highest summit, at a distance this side of the prairie lake of seven and three-quarter miles, is three thousand eight hundred and thirty-six feet above the level of the sea. There is a summit five and a half miles beyond the prairie lake whose altitude is 3,702 feet above the sea. The altitude of the prairie lake is three thousand five hundred and fifty-eight feet. To adjust, however, a grade of forty feet, there will have to be cuts through the several summits, and excavations and embankments throughout the route. Sun river should be crossed with a bridge fifty feet above its valley, and the descent must be made with much care by side-hill locations, for in fifteen and three-fourths miles there will be a descent of three hundred and sixty-six feet. The Dearborn is crossed about a mile and a half above its junction with the stream flowing from Cadotte's pass with a bridge seventy feet above its immediate valley, and at

an elevation of four thousand three hundred and forty feet. There is a high ridge five and six-tenths miles beyond the crossing of Crown Butte creek, and twenty miles from Sun river, where a tunnel will be required a half mile in length. This ridge has an elevation of four thousand two hundred and thirty-five feet above the sea, and the summit level of the tunnel will be four thousand and seventy-two feet. The grade, on the supposition that it will be uniform from Sun river to the tunnel, will be forty-four feet per mile, but the work will be difficult, and it will not probably be found practicable to dispense with less than sixty feet grades.

From this tunnel to the Dearborn there will be a rise in the whole distance of two hundred and sixty-eight feet, giving grades, on the supposition that they are uniform, of sixteen and a half feet to the mile. From the crossing of the Dearborn to the entrance to the tunnel is a distance of ten miles, requiring grades of sixty feet to the mile. This work will be very costly and heavy, and require very careful side-hill location. Besides heavy excavations and embankments, there will be a great number of small bridges and culverts. The eastern debouche of the tunnel will be in the debouche of a ravine, described by me in the narrative of 1855, which gives a much better approach than the usually travelled trail. The tunnel will be 4.19 miles in length, when there will be a cut commencing fifty feet deep and coming out into the valley of the Blackfoot five hundred and fifty-eight thousandths of a mile west of the tunnel. The cut and the tunnel have a grade of sixty feet to the mile. The highest point of the road, therefore, will be at the entrance to the cut, at an elevation of five thousand one hundred and ninety-five feet above the sea, and eight hundred and forty-nine below the mountain summit. The entrance of the cut will be two and nine hundred and forty-eight thousandth miles west of the western base of the mountain, which is five hundred and sixty-seven feet higher than the eastern. This section, from Fort Benton to the entrance to the tunnel, is in the near vicinity of materials for construction; there is good building stone near the crossing of the Sun and Dearborn rivers and near the Crown Butte creek. The Teton, Sun, and Dearborn furnish sand and gravel as well as good cotton-wood. The Missouri and the mountains in the vicinity of the pass will furnish the yellow and pitch pine. Cadotte's pass can be reached more readily on this route than by going high up Sun river, crossing over to the Dearborn, and over the broken country lying between the Dearborn and the entrance to the pass.

The route by the Missouri to the crossing of Sun river will be easier in its grades than that over the plateau, but it will be heavier work of excavation and embankment. There are many sharp points running down to the Missouri which must be dealt with in the same manner as the similar places which occur below Fort Benton. The distance will be sixty-three miles, or seven and a half miles further than the route over the plateau. There will be advantages, however, on the line of the Missouri in the unfailing supply of pure water, and its greater accessibility to all the materials of construction.

To reach Lewis and Clark's Pass, either of these routes may be taken to Sun river, when we continue up Sun river and its Elk or south tributary, a distance of forty-eight miles, or ten miles above the forks. The valley of the Sun river and that portion of the Elk Fork is very easy for railroad construction, and the grades will vary from 43.5 feet to 5.03 feet per mile.

Starting from Fort Benton we make a rise in eleven and a half, twenty-five, sixteen, twenty-two, fifteen, ten and a half, and ten miles, respectively, of eighty-three, one hundred and sixteen, four hundred and ninety-five, one hundred and eighteen, one hundred and ninety-seven, three hundred and twenty-five and one-tenth, and four hundred and fifty-five and nine-tenths feet, giving the respective grades of seven and twenty-one hundredths, forty-six and

four-tenths, thirty and nine-tenths, fifty-eight and one-tenth, thirteen and one-tenth, thirty and five-tenths, forty-five and six-tenths feet to the mile. At the great falls of the Missouri, where in fifteen miles there is a fall of 357 feet, the grades must be adjusted with great care at the expense of heavy work. For ten miles above the forks of Sun river the grades will vary from forty to fifty feet per mile. The work of excavation and embankment will be light. Thence to the tunnel of Lewis and Clark's Pass is nineteen and one hundred and twenty-one thousandths (19.121) miles, all very difficult and heavy work. The tunnel itself is two and one hundred and twenty-nine thousandths (2.129) miles in length. The summit level of the tunnel is at a debouche a half mile west of the western base of the mountain, and is 5,698.6 feet above the level of the sea. It passes out on a descending grade of sixty feet to the mile, at an elevation of 5,570.86 feet above the sea, the summit level of the mountain being 6,519.3 feet above the sea. As in Cadotte's Pass, the eastern approach is by a ravine north of the travelled trail. In ten miles above the forks the line leaves the general valley of the Elk Fork, crossing the highest summit about halfway between the route of the party of 1855 and Heart mountain, and crosses Dearborn river at an elevation of 4,994 feet above the sea, and about one mile above the trail. The country is lower and less broken by this route than in any other part of the plateau between the upper waters of the Sun and Dearborn rivers. The Dearborn itself leaves the mountains by a gap in a direction nearly east, when it turns suddenly to the south, and continuing on three miles, it turns suddenly again to the east to the point where it crosses the trail. The railroad line follows along the Dearborn on this south line three miles, and makes the crossing just below its last turn to the east. A bridge, one mile in length and nearly 300 feet above the valley, which at this point has an elevation of about 4,700 feet above the sea, will be required to cross the Dearborn. Thence for two miles and three-eighths the road will follow very nearly the natural grade, varying from forty to sixty feet to the mile. In two miles and three-quarters further we come to a ravine, in which flows a stream of water which can only be turned by continuing up the ravine and keeping closely along the side hills. Between this point and the entrance to the tunnel, a distance of ——— miles, there will be seven small streams to cross, involving the adjustment of a grade of sixty feet to the mile, the necessity of constant curvature with radii of 1,500 or 2,000 feet. There will be very heavy embankments required to cross these several streams, which can, however, be made up from the adjacent spurs with hauls exceeding in no case a half mile. Moreover, the ravine, into which the tunnel debouches on the east, by the best system of side hill approach, must be filled up, which can be done by the debris from the tunnel. The country at right angles to the line of the road rises towards the mountains at a grade of from one-fourth to one eighth. This is equally the case with the ravines in which the streams flow and the intermediate divides. Debouching from the tunnel on the western side, the line continues in the valley of the stream for five miles at a grade of thirty-five feet, with an excavation and embankment almost entirely along the natural surface; and for a mile and a half further at a grade of forty-four feet to the mile, when we leave the stream, and, making a cut through a low divide of about 700 feet in length, come upon a gently sloping prairie, down which it can be laid and brought into the valley of the Big Blackfoot through the open valley of a small stream at a grade of from sixty to sixty-five feet to the mile. This grade will involve closely hugging the side hills which line the valley of the small stream and the Big Blackfoot on the west, and will involve a curve of the minimum radius. The greatest depth of the cut will be $134\frac{7}{10}$ feet. For the first 80 feet the cut will be from $134\frac{7}{10}$ feet to $122\frac{6}{10}$ feet in depth, and for the next 500 feet from $122\frac{6}{10}$ to

38 $\frac{8}{10}$ in depth; then in 100 feet the cut reduces to 31 $\frac{4}{10}$ in depth, and in 1,000 feet further to 20 $\frac{8}{10}$ feet in depth, and it runs out in 200 feet further.

To resume the line down the Blackfoot from Cadotte's Pass. From the summit level, at the entrance, to the tunnel, the line continues down the valley for six and twenty-eight-thousandths miles, when it is joined by the line from Lewis and Clark's Pass. Three-fourths of a mile before reaching this point it crosses the stream flowing from the pass. Continuing for four and one-fourth miles further, it crosses Lander's Fork. A considerable bridge will be required here, consisting of a single arch of two hundred feet; excavations and embankments will average from fifteen to sixteen feet. It then continues down the valley, which has been gradually widening from the pass, for nine miles, when it reaches what is known as the Cañon. In this distance two streams are crossed, coming from the north. This distance is in the prairie known as the Belly. The work here will be very moderate, the excavations and embankments small. The cañon is a low open valley, in no case less than one-third of a mile in width, and widening out two or three miles. Excavations and embankments are moderate. The country is mostly wooded. Seven miles from the entrance to the cañon we come to a prairie of one thousand acres, which is overflowed at high water, and against which special precautions will have to be made. Only one stream of any consequence is crossed, about three miles before issuing from the cañon. Leaving the cañon we come into the large prairie which has been particularly described in the narrative. At this point the Blackfoot will have to be crossed twice in a distance of a mile and a half. The distance across the prairie is thirty-four and six-tenth miles, and the line can be laid in nearly a straight course by adapting the grade to the ground, at the expense of heavy excavations and embankments. In about eight and a half miles Salmon Trout creek is crossed, requiring a bridge and careful adjustment of the line. In ten and a half miles further another large stream is crossed, and in the remaining distance two or three small streams will have to be bridged; and seven miles before reaching the end of the prairie a cut must be made through a low ridge.

We have now come to the lower cañon of the Big Blackfoot. This cañon is nineteen miles long, and is perfectly practicable. The river must be crossed frequently, not, probably, less than thirteen times, and, to avoid short curvatures, there must be heavy excavations, mostly in rock. Embankments will be moderate. There will be no difficulty in wasting earth. Occasionally sustaining walls must be resorted to. In the narrative reference has been made to the prairies opposite projecting points, and in locating the railroad line care must be taken to pass from prairie to prairie.

In six miles further we come out of the valley of Hell-Gate into the general valley of the Bitter Root, at a place known as the Hell-Gate Ronde. Here a trail crosses the Hell-Gate to Fort Owen. This point, in the estimate, has been called the crossing of Hell-Gate.

In this section of ninety-one and sixty-eight-hundredths miles from the tunnel there will be ample materials for construction of all kinds; timber for all purposes of construction inexhaustible; ample supplies of water, gravel, and sand are found at convenient points. There are many localities of good building stone. Slate is to be found at the mouth of Salmon Trout creek, and limestone, suitable for walls of all kinds, in the lower cañon.

The whole descent in this distance is 1,735.8 feet, or an average grade of 18.94 feet to the mile. The several grades are shown on the profile, on the supposition of uniform grades for the several distances will vary from 63 feet to 3.11 feet to the mile. But it will probably be found advisable, to diminish excavations and embankments, not to use as low grades as three and

one-tenth feet to the mile; though, without large excavations and embankments and proper side hill location, there will be no necessity of using grades greater than fifty feet to the mile. It is probable that a better line can be found by turning to the south seven miles before reaching the western end of the prairie, crossing the Big Blackfoot, passing through the extensive Kamas prairie on its southern side, and returning to the immediate valley of the river, six miles before reaching the end of the cañon. There will be no difficulty from freshets in this section. The prairies are not overflowed in high water, except small portions of the Belly prairie, and the greatest rise and fall of the Big Blackfoot will be about six feet.

Before describing further the railroad line, I will briefly state the characteristics of the route of 1853 down Clark's Fork.

HELL-GATE CROSSING, VIA CLARK'S FORK, TO THE SPOKANE.

The route is the same with the route of 1855 for seven and a half miles below the Hell-Gate crossing, when it follows the northern foot slope of the Hell-Gate Ronde and passes over the summit which lays between it and the Flathead river, with a gradient of thirty-five feet per mile, or, allowing for errors in the barometer, of forty feet. Having attained this summit, it strikes a tributary of the Jocko, and descending along that stream to the valley of the Flathead, the gradient being forty feet (assumed at fifty) down the tributary of the Jocko, and down the main streams as well as down the Flathead to its junction with the Bitter Root, twenty feet. By the barometer the average fall of Clark's Fork is about eleven feet per mile. The road is estimated to descend at gradients of from fifteen to twenty feet per mile. After leaving the Jocko the road should follow the hills on the left side of the Flathead, to a point some miles above its junction with the Bitter Root. Then crossing, it would follow the right bank of Clark's Fork as far as Big Rock. Here it would cross, and following down the left bank, would recross at the Cabinet. Then tunnelling the Cabinet mountain three hundred yards, it would continue on the right of the river to Lake Pend d'Oreille, and on the northern side of that lake to its lower extremity. Both along Clark's Fork and the lake fifteen feet is about the difference of high and low water mark, and the road must therefore keep the sides of the hills, in some instances requiring high embankments. The tunnel at the Cabinet mountain would be through a formation of which fifty per cent. is rock, this being basaltic trap. The transit from Clark's Fork to Spokane could be made with gradients of not more than twenty-five feet. It might be facilitated by making use of the valley of a small stream which empties into Clark's Fork about twelve miles below the lake, and by a valley seen ten miles west of Clark's Fork, which appears to make into Cœur d'Aléne prairie. A bridge half a mile long would be required to cross Pack river. Excellent timber and good stone are found along the whole of this distance. The crossing of the Spokane will involve heavy work of bridging, excavation, and embankments, but beyond, over the Great Plain of the Columbia, there are many practicable lines. But to resume.

HELL-GATE CROSSING TO CROSSING OF BITTER ROOT—DISTANCE 65 MILES.

Hell-Gate crossing is about three thousand and three hundred and fifty-nine feet above the sea. The line for ten miles and a half crosses diagonally the Hell-Gate Ronde. There are several small streams and swales in this distance. Excavations and embankments moderate; grade $30\frac{1}{2}$ feet to the mile. Here a stream is crossed, and continuing down on the east side of the Bitter Root for sixteen miles through, for nearly the entire distance, a wide, open valley,

the Bitter Root is crossed. The line follows the west side of the Bitter Root over a broad and extensive prairie, partially wooded, when it recrosses the Bitter Root; and continuing on its east side for thirty-one miles, crosses it for the third time just above the mouth of the St. Regis de Borgia. In the above distance of sixteen miles before making the first crossing of the Bitter Root, the work of excavation and embankment will be very light for about six miles, when a deep cut must be made through a ridge in rock. In three-quarters of a mile there is a deep re-entering of the river; a sort of delta formed by two streams three-fourths of a mile apart. An embankment forty feet high and two bridges will be required to cross this place, and there will be curvature at both extremities of the embankment. Before reaching the crossing there will be a considerable rock excavation. The total descent in the distance is 1,465.3 feet, giving a grade of 22.5 feet to the mile. To avoid excessive excavations and embankments, grades of forty feet should be adjusted to the ground, and considerable curvatures must be allowed.

The point of crossing the river is at a turn where a bridge two hundred feet long can be thrown nearly at right angles with the course of the stream without involving excessive curvature. The banks are only about fifteen feet high. Suitable building stone can be obtained in the immediate vicinity. After crossing, the line follows the next bank over a low plateau under a side hill for about one mile and a quarter, when it comes round a point of rocks involving a very heavy excavation, almost exclusively in rock, and there will be a very heavy excavation in rock for a mile and a half further. Then a marsh has to be crossed, requiring an embankment of twenty feet. The remaining four and a half miles before re-crossing the river over the partially wooded plateau referred to will also require, in places, large excavations and embankment. The plateau rises in terraces of from ten to twenty feet in height, and some curvature will be necessary, and an undulating grade, not, however, exceeding thirty feet to the mile. The second crossing is of the same character as the first. About the same length of bridge and the same direction in reference to the course of the stream. The banks are forty feet high. The fall in this distance of seven and a half miles is 8.63 feet, and the average grade 1.75 feet. Continuing over on the east side of the Bitter Root the line follows for eight miles near to or along the immediate banks of the river, at from forty to eighty feet above the water level; or the same point could be reached by the line leaving the river in two and a half miles and crossing in one mile a low point in a spur which runs in a northwest and southeast direction, involving a short tunnel or deep cut of about five hundred yards. The first mode is preferable. For five-eighths of a mile further the line will run along the water's edge, there being the whole distance a steep ridge of rocks with broken stone at the base and partially up the slope. Trees are, however, growing out of the fissures of the rocks. Care must be taken to adjust curvature in this distance, and at two places the line must be built in the water. It will not interfere with the water way. For three and one-eighth miles further the line follows the plateau; two streams in this distance requiring inconsiderable bridges. This plateau is thirty to seventy feet above the river. Then one-eighth of a mile side hill work; curvature fifteen hundred feet.

Then comes a beautiful partially wooded prairie for four and one-fourth miles. Excavations and embankments moderate. There will be a half a mile of side hill work during the next two miles. We then cross a fine mountain stream and come to a plateau again for three and three-fourth miles, with terraces as described in the plateau on the west bank of the river, and situated in a large re-entering. For one-half mile some side cutting, when a stream is crossed; and continuing up a plateau about thirty feet above the water level of the river for half a mile, we

come to high, steep bluffs stretching along the river for three hundred and fifty yards. The banks for this distance are liable to slide, and it is the only point of the line on this division where slides are liable to occur; for the fixed regimen of all the other banks and side hills is shown by the forest growth on their sides. These bluffs can be passed by a bridge of a single arch, resting on abutments on the fixed river banks at the end of the bluffs, and running along the river sides. If a slide occurs, it will pass under the arch of the bridge. The next two miles is along a plateau ten to twenty feet above the water level, with but moderate excavations and embankments, when two spurs have to be passed not involving heavy work, and requiring, to pass to the plateau beyond, some curvature and side cutting. Then for three and five-eighths miles the line with but little curvature can be easily located, when for one-eighth of a mile side hill work will be required, when we come to a prairie which extends along the line for three-eighths of a mile, when a sharp point comes down that will require a deep cut or a short tunnel. For three-eighths of a mile side cutting, and for one and a half mile a plateau eight to ten feet above the water level, when the river has to be crossed again. The whole fall from the second to the third crossing of the river is 20 feet. The line at the crossing of the Bitter Root, along the mouth of the St Regis de Borgia, is two thousand eight hundred and ninety-three and nine-tenths feet above the sea.

The materials for construction down the Bitter Root are very abundant. There will be no practical difficulty in procuring building stone. There are many navigable reaches of the river for boats and scows. Stone can easily be transported by the river to the point where it may be needed. I am satisfied good building stone is to be found at many points on the river and in the adjacent country. The bridge could, if necessary, be built of the timber of the country. The third crossing of the Bitter Root will be by a bridge one hundred and fifty yards long. Banks, gravel on both sides, one to three feet above the highest water. Greatest rise and fall of the river, eight feet. The work on this station will be very much less than was stated in the report of the explorations of 1853. It was more carefully examined in 1855.

CROSSING OF BITTER ROOT TO ENTRANCE TO TUNNEL THROUGH THE CŒUR D'ALÈNE MOUNTAINS—
DISTANCE 35 MILES.

In this distance the line rises one thousand and ninety-six and ninety-three one-hundredths feet, reaching an elevation of three thousand nine hundred and ninety and three hundredths feet above the sea, and giving an average grade of thirty-one and four-tenths feet to the mile. The grades in the immediate valley of the river are as follows, on this distance: twelve and one-fourth miles, thirteen and three-tenths feet to the mile; three and three-fourth miles, six and seven-tenths feet per mile; two and a half miles, forty-three and five-tenths feet to the mile; seven miles, thirty-three and six-tenths feet to the mile; two and one-half miles, natural grade of the surface sixty-nine and six-tenths feet per mile, to which sixty feet grades can be adjusted; two and three-fourths miles, twelve and eight-tenths feet to the mile; one mile, seven and six-tenths feet; and three and one-fourth miles, the natural surface is one hundred and eight feet to the mile. Sixty foot grades can be adjusted on this distance by careful side-hill location, minimum curvatures, and heavy excavations and embankments; and this will be the character of the work for this grade for the last five miles of the St. Regis de Borgia section before entering the tunnel, with this exception, there will not be excessive excavations and embankments on this section. To avoid excessive curvature, the points in turns of the river will have to be sternly dealt with. Nor will there be much rock cutting. There will, however,

be a great amount of bridging—some considerable structures—as the river must be crossed obliquely. A single arch will always be sufficient. It will sometimes be necessary to resort to side walls. The trail crosses the river forty-four times. The number of bridges will be much less; several tributary streams to be bridged; much culvert work; road-bed to be well raised. The valley is not subject to overflow; its banks are four to twelve feet above water-level, several places covered with water at its highest stage. Greatest rise and fall near the mouth of the St. Regis, about five and a half feet; sixteen miles higher up, four feet. There will be considerable wood to cut through, and much gravelling. The wood will generally be a small growth in the river bottoms. The materials for construction will be literally inexhaustible. Good limestone was observed at several points, especially about midway of the section.

TUNNEL AT THE CŒUR D'ALÉNE MOUNTAIN.

This tunnel will be $1\frac{3}{4}$ mile, in easily worked limestone and earth. It passes from the Cœur d'Aléne to the St. Regis de Borgia in a south by east course, making nearly a right angle with the general course of the road. The summit is at the eastern debouche, at an elevation of 3,990.03 feet above the sea. It descends to the west at a grade of sixty feet to the mile, and its elevation on the western extremity is 3,877.1 feet above the sea. The summit level of the divide on the usually travelled trail is 5,089.7 feet.

TUNNEL TO CŒUR D'ALÉNE MISSION—DISTANCE $48\frac{1}{2}$ MILES.

In this distance the line falls 1,586.9 feet to an elevation of 2,298 feet above the sea, and giving an average grade of 32.74 feet to the mile. The grades along the immediate valley of the river are as follows:

$\frac{1}{4}$ th mile,	94.8 feet to the mile.
1....do..	101.1.....do.
$\frac{1}{2}$....do..	131.8.....do.
$\frac{1}{2}$....do..	131.4.....do.
$\frac{1}{4}$....do..	4.3.....do.
1....do..	79.2.....do.
$3\frac{1}{2}$....do..	66.2.....do.
$3\frac{1}{2}$....do..	56.1.....do.
8....do..	28. ....do.
6....do..	60.6.....do.
5....do..	38.34.....do.
8....do..	
11....do..	
$48\frac{1}{2}$ miles, fall 1,586.9, grade 32.74 feet to the mile.	

For the first $10\frac{1}{2}$ miles from the tunnel the road must be very carefully located along the side hills, north of the river, to use sixty feet grades. The side hills run gently to the river. There is a narrow open valley for $2\frac{1}{2}$ miles to the point where the trail crosses the river to pass over the divide, and for $4\frac{1}{2}$ miles further the route is through wood, sometimes of small growth. In this distance three streams are crossed. The next nine miles will require great care in location. The trail passes over low side hills north of the river, and in some cases a mile from

it; and these side hills come well down to the river, in some cases with a steep slope. The excavations and embankments will be large, and in some cases sustaining walls will be required. Four streams, and several places where water runs in the spring, occur in this distance. Crossing then a low place for three-fourths of a mile there are two slues. The road passes through a very heavy cedar, and in one-fourth of a mile reaches the point of junction with the trail over the mountain to the south of the Cœur d'Aléne river. Here a stream comes in from the south. In the next six miles the Cœur d'Aléne is crossed on the trail six times, but the road can be located without crossing the river more than half that number of times. Thus far, except in the low place and forest of cedar referred to, the river does not overflow its banks. The next thirteen miles the river is crossed sixteen times on the trail, nine of which are within the distance of $2\frac{1}{2}$ miles, and in the remaining eleven miles it is crossed but twice. In these two last distances of twenty-four miles there are distances where the road will pass over wet and marshy places. There will be some, though not excessive, rock cutting. The whole section, from the tunnel to the Mission, will have a large amount of bridge and culvert work. The bridges will none of them be difficult or costly structures, but frequently they must run quite obliquely to the course of the river to avoid short curvature. The bridges may be wooden structures. Piles could be used in passing some of the wet places. The mountain pine in the vicinity will furnish abundant material for this and all other purposes of construction. There is good building stone at several localities, limestone up the stream, and slate lower down; gravel, sand, and clay occur at convenient points. The highest rise and fall of the river is four feet.

CŒUR D'ALÉNE MISSION TO CROSSING OF COLUMBIA—DISTANCE 183 $\frac{1}{4}$ MILES.

The line keeps north of the Cœur d'Aléne river and lake, and crossing the Spokane, or, more properly speaking, Cœur d'Aléne, near the eastern edge of the Cœur d'Aléne prairie, passes in nearly a straight direction to the main Columbia, near but above the mouth of the Yakima. The line could keep still further down the Cœur d'Aléne and Spokane to a junction with the railroad line reported practicable as the result of the explorations of 1853-'54. The course laid down on the map and described above is unquestionably practicable, the whole country having been under view; but great care will be required to locate a crossing of the river, and to gain the plateau beyond; for there are spurs running down from the south to the Cœur d'Aléne river and lake which have to be turned. The line is located on the map at the foot of three spurs. But between the river and the Kamas Prairie creek, there is a divide which will have to be surmounted, and corresponding to the ridges found in other parts of the Great Plain. The distance from the Mission to the crossing of the Cœur d'Aléne is twenty-seven miles. There will be much heavy work on this distance—considerable curvature and some rock excavation. The route, after leaving the Mission two miles, will pass through a rolling and wooded country, interspersed with prairies for about eighty miles. The remaining distance to the Columbia is destitute of timber—a distance of about one hundred miles. Except for this portion, timber, wood, building stone, sand, clay, and gravel abound for purposes of construction. For the portion destitute of timber the supply must come from the extremities. The upper Columbia will furnish an inexhaustible supply. There is no danger of a deficiency of water, as there are many streams and lakes along the route.

The fall from the Cœur d'Aléne Mission to the crossing of the Spokane is about 198 feet in thirty miles, giving an aggregate grade of $3\frac{2}{3}$ feet to the mile; and from the crossing of the

Spokane to the crossing of the Columbia 1,598 feet in $151\frac{3}{4}$ miles, or an aggregate grade of $10\frac{1}{2}$ feet to the mile. But there will be several summits in this distance, and a maximum summit of about 2,600 feet above the sea. It is not probable that grades exceeding forty or fifty feet to the mile will be required along this distance.

CROSSING FROM THE COLUMBIA TO SEATTLE, ON PUGET SOUND—DISTANCE 220 MILES.

The Columbia river, for fifteen miles above the mouth of the Yakima, is 400 yards wide, with sand and gravel banks thirty feet high.

The railroad line passes up the valley of the main Yakima to the Snoqualme Pass, where there are two routes for tunnelling through the divide—one being by a route south, and the other by a route north of Lake Kitchelus. The first brings the line to the valley of the Nooknoo or Cedar creek, which can be followed down to its junction with the stream flowing from the Dwamish lake to the Dwamish river, near the outlet of the lake. The line then runs in nearly a straight course to Seattle; or, following down the Nooknoo twenty-nine miles and a half, the line may take the summit and northern slope of the low ridge separating Lake Morree from the valley of the Snoqualme, and from that taking a spur running from the Nooknoo falls to those of the Snoqualme, reach the latter falls at a distance of forty-five miles from the tunnel. Thence the distance to Seattle is thirty miles, and the grades do not exceed twenty feet. The route north of Lake Kitchelus comes immediately upon the waters of Snoqualme; and although no observations have been taken for altitude, intelligent gentlemen who have been over both routes state that it is lower, and involves less tunnelling than the route south of Lake Ketchelus. There are two modes of piercing the mountain south of Lake Kitchelus: first, by means of a tunnel four thousand yards in length from the level of Lake Willailootzas, two thousand nine hundred and ninety-three feet above Vancouver; second, by a tunnel eleven thousand eight hundred and forty yards long, from the level of Lake Kitchelus, two thousand three hundred and eighty-eight feet above Vancouver. The average grade to the Snoqualme falls, with the use of the long tunnel, will be forty-six and three-tenths feet per mile, and with the use of the short tunnel, fifty-nine and eight-tenths feet per mile.

The ascent up the valley of the Yakima is as follows:

From the crossing of the Columbia to the commencement of the pine timber is a distance of ninety-six miles. The general character of the valley to this point is wide, open, and terraced; the ground of sand, gravel, or loose stones; but little clay or vegetable mould; curves easy; long stretches of straight road perfectly practicable. In this distance there are five points where the hills come close to the river, making, at most, ten miles of side-cutting necessary. This cutting is generally in earth, loose stone, or trap rock, easily broken into blocks. In addition to these five points, the last eight miles of the ninety-six will be principally side-cutting in earth, gravel, and sand; the work light, and no very high side slopes. In the first eighty miles from the Columbia the grade will be $12\frac{1}{2}$ feet to the mile; in the last sixteen miles it will be $8\frac{1}{2}$ feet to the mile. By keeping thus far the north bank of the Yakima, the only bridges of any consequence will be two, over streams each about seventy-five feet in width.

At some place in this vicinity it would be advisable to cross to the south bank of the Yakima, which is here about forty yards wide; good crossing easily found; plenty of timber on the spot; stone for masonry within twenty-five miles by water. The road now keeps to the valley

twenty-one miles further on, four miles beyond Ksitkas, passing through an open pine woods; soil light, sometimes gravelly; about two miles side cutting; grade eight feet to the mile.

If the short tunnel be used the road, at this point, must leave the valley, take a side location on the northern slope of the mountains bordering the valley on the south, and ascend eight hundred and ninety-five feet in eighteen and a half miles, giving a grade of $48\frac{4}{10}$ feet per mile, in fifty per cent. rock. The Plateau of Willailootzas, one mile long, will be entered by a curve, with a radius of about two thousand feet, and the road pass along the north bank of the lake, with side location in eighty per cent. trap rock, easily worked. This lake should be partially drained; its shores are steep, and of broken stone. There will be some little difficulty in preparing a proper depot for the workmen, tools, &c., at the entrance of the tunnel; or, if the long tunnel be used, then, commencing at the point eighteen and a half miles east of Willailootzas, there will be eighteen and a half miles, with a grade of $15\frac{2}{10}$ feet per mile, and with but little side cutting, through a thickly timbered country as far as Kitchelus.

Both tunnels will pass through solid rock, (silicious conglomerate,) and there will be cutting through rock of similar character on the mountain spur bordering the valley of the Nooknoo. Yellow pine grows abundantly on the Yakima, ninety-six miles from its mouth, and can be rafted down at high water. Granite can be brought down from a point about one hundred and forty miles above the mouth of the Yakima, and good sandstone and limestone are to be found on Puget Sound. The question of snow has been sufficiently considered in the meteorological paper.

Seattle is an admirable harbor for a great railroad depot, being land-locked, defensible, accessible, and commodious. The harbor at the entrance of Snoqualme, or, as it is named in the lower part of its course, the Sno-how-mish river, has mud flats, with a good harbor between the flats and Point Elliott to the south. The suggestion is whether the line may not follow down the Snoqualme on its north bend, cross over to Whidby island, and the depot be established on its western shore, nearly opposite Port Townshend. This will require works of the largest and most expensive character; for an artificial harbor must be made, by a breakwater midway between the island and the opposite shore. When it is recollected that with such a breakwater—for such a form and position can be given to it as that a heavy battery, with a keeper's tower, can be planted on it—the extensive waters of the sound could be defended by a single system of works at Port Townshend, the suggestion may not be altogether without significance. A small work would be, of course, required at Deception Passage; a branch road down the Columbia to Vancouver, and extension, *via* line of Cowlitz, to Puget Sound. On the map I have exhibited this branch as leaving the main trunk twenty miles before reaching the Columbia. This is not done as giving a location, but simply for convenience of reference. There should, if practicable, be but one bridge crossing by the Columbia for the two branches, supposing the branch down the Columbia should keep along its south bank, as minute surveys can determine the particular details. On the north side of the river the party of Mr. Tinkham found it necessary in only two instances to cross the rocky spurs which jut out from the river bluffs. The Columbia River Pass is not, undoubtedly, practicable, but is remarkably favorable. The only tunnel required will be to effect the passage around Cape Horn mountain; this will not exceed seven hundred feet in length, and a close examination may prove even this to be unnecessary. There need be no gradient to exceed ten feet per mile, but considerable side cutting in the rock will be necessary. The high floods to which the river is subject are the most serious obstacles to obtaining the advantages of cheap construction offered by its valley; to avoid these it will be necessary

to run the road at some distance above the water; but as much of the slope consists in debris, workable with the shovel, embankments will be easily made, and when constructed will be of the most durable kind.

At eastern prices this work might be done at fifty cents per cubic yard. The tunnel through Cape Horn mountain would cost, at eastern prices, say, sixty-five dollars per lineal foot, a high estimate, considering the character of the road. The easy access to this part of the route will make it cheaper of construction than parts of the same character further in the interior.

The bluffs along the Columbia cease near Cape Horn, and passing through a level bottom land, partly wooded, as far as the Cowlitz, it turns northward from the Columbia, and follows the wide Cowlitz valley, with an easy ascent, to the prairies occupying about half of the country on the line from thence to Puget Sound. Along the eastern shore of Puget Sound, from Steilacoom to Seattle, it passes through dense forests for most of the way, and crosses several large streams, which will probably make a terminus higher up the sound desirable for a route approaching by way of the Columbia. Good building stone, excellent timber, and abundant water is found on this part of the route, while fine gravel, constituting the soil through most of the way, offers a superior material for the road-bed. But Lieutenant Mullan reports that, by his Wagon Pass, a railroad line can be laid across the Rocky mountains with only a cut one hundred feet deep through the divide, which is but half a measured mile from base to base, and that no excessive grades will be required on the eastern approach. The descent down the valley of the Little Blackfoot and Hell-Gate is exceedingly favorable. Thus a line can be laid down from the Mississippi to Olympia, on Puget Sound, with but short and few tunnels, but which will be two hundred and seventy-six miles longer than the route by Cadotte's, the Cœur d'Aléne, and the Snoqualme Passes to Seattle. We cross the Rocky mountains by the northern Little Blackfoot or Mullan's Pass, then follow down the Little Blackfoot and Hell-Gate valleys, cross over the Jocko divide to Hell-Gate, follow down Clark's Fork to below the Pend d'Oreille lake, cross over to the Spokane, and, finally, after passing over the great plain of the Columbia, follow down the Columbia valley to near the mouth of the Cowlitz, and reach the sound by the easy and practicable line of the Cowlitz and intermediate country. If, instead of a cut of half a mile through Mullan's Pass, this distance should have to be travelled, the only remaining tunnels will be at the Cabinet, three hundred yards in length, fifty per cent. in basaltic trap, and Cape Horn, seven hundred feet in length. By this route the distance to Olympia from St. Paul will be two thousand and forty miles, against one thousand seven hundred and sixty-four miles, the distance to Seattle by the route of the tunnels.

By the *tunnel* route the elevation above the sea is as follows:

BRECKINRIDGE TO SEATTLE.

Number of miles at an elevation above 0 and less than 1,000 feet	130 miles.
Number of miles at an elevation above 1,000 and less than 2,000 feet	433 "
Dodo2,000do3,000 feet	733 "
Dodo3,000do4,000 feet	180 "
Dodo4,000do5,000 feet	62 "
Dodo5,000 and above	6 "

Summit level, 6,046.

Tunnel at an elevation of ———.

On the route from Breckinridge to Vancouver the distances and elevations are as follows:

Below 1,000 feet below the sea	243 miles.
Between 1,000 and 2,000 feet below the sea	391 "
Between 2,000 and 3,000 feet below the sea	648 "
Between 3,000 and 4,000 feet below the sea	178 "
Between 4,000 and 5,000 feet below the sea	61 "
5,000 feet or more above the sea	6 "

The sum of ascents and descents from Breckinridge to Seattle are 21,787 feet, and to Vancouver 17,587.

Equated distances from Breckinridge to Seattle *via* Cadotte's Pass, —.

Equated distances from Breckinridge to Vancouver *via* Cadotte's Pass, —.

There is only 320 miles of uncultivated country along the line of the route.

Before giving the estimate I will state that there are many advantages in bringing the line to the Mission rather than taking it from Milk river and crossing the Marias and Teton high up towards the mountains, as recommended in my report of 1854. The cost is diminished thereby; the road is brought at once directly to the head of navigation of the Missouri; it dispenses with the necessity and expense of a spur road; it renders unnecessary the reservoir for water at Grizzly Bear lake; there will be the most ample supply of water along the line of the route about to be estimated upon; Box Elder, Sun river, Elk Fork, the Dearborn, the several tributaries of the Dearborn, and the creeks flowing westward from the divides of Cadotte, and Lewis and Clark, will, as well as the Mission, furnish an inexhaustible supply of the purest water; it will bring the whole of this portion of the route into the close vicinity of a well wooded region; it will effect a great saving in transportation; it will be near water power; it will hasten by six months the completion of this portion of the road; the old location, from Sun river to the Dearborn, will involve exceedingly heavy excavations and embankments.

ESTIMATE OF COST.

The estimate of cost of road is not given for the distance east from Breckinridge on the western boundary of Minnesota, to which point the Minnesota and Pacific Railroad Company have located a road under the recent grants of Congress. Their route crosses the Mississippi near the Falls of St. Anthony, does not deflect more than — miles at any point from an air line, and saves 20 miles in distance over my surveyed routes. Moreover, with means at hand, it can be built for less than my estimate by \$25,000 per mile, viz: for about \$21,000 or \$22,000 per mile.

An estimate is given of the cost of the road from Breckenridge to Seattle and Vancouver, both by Cadotte's and Lewis and Clark's Passes. First, by passing the plateau generally, and the route of the main train; and second by the Missouri Great Falls and Sun river, as explained in this paper.

Estimate of cost of road from Breckinridge to Seattle, via Fort Union, Fort Benton, Cadotte's Pass, Cœur d'Aléne Mission, north of the Cœur d'Aléne Lake, and the Snoqualme Pass, using the long tunnel. Entire distance, 1,544.51 miles.

	Miles.		Per mile.	
Breckinridge to crossing of Milk river	712	at	\$40,000	\$28,480,000
Crossing of Milk river to point of departure from Box Elder	30	"	40,000	1,200,000

	Miles.		Per mile.	
Thence to Fort Benton	51½	at	80,000	\$4,120,000
Fort Benton to entrance to tunnel	102.2	"	70,000	7,154,000
Short tunnel, 2,640 feet, at \$120 per foot .....	.....		.....	316,800
Tunnel, 22,123 feet, at \$130 per foot	4.190		.....	2,875,990
Thence to crossing of Hell-Gate	91.86	"	60,000	5,511,600
Thence to crossing of Bitter Root	65	"	50,000	3,250,000
Thence to entrance into tunnel	35	"	60,000	2,100,000
Tunnel, 1.6 miles, at \$130 per foot	1.6	"	130	1,098,240
West end of tunnel to Cœur d'Alène Mission	48½	"	60,000	2,910,000
Thence to point beyond crossing of Spokane	70½	"	60,000	4,230,000
Thence to fork of line to Vancouver	91.25	"	45,000	4,106,250
Thence to crossing of Columbia	20	"	45,000	900,000
Thence to entrance to long tunnel	138.25	"	50,000	6,912,500
Long tunnel, 11,840 yards or 6¾ miles, about \$140 per foot or \$420 per yard	6.75	"	.....	5,000,000
Thence to Seattle	75	"	60,000	4,500,000
Total length in miles	1,543.60		.....	84,665,380
Steamers on the Missouri and Columbia				1,500,000
Reservoirs, aqueduct, &c.				2,000,000
Depots and permanent fixtures				1,750,000
Engineering and contingencies				5,000,000
				94,915,380
The cost of the short tunnel will be, 4,000 yards, or 2.247 miles, at \$390 per yard				\$1,560,000
Add 4½ miles of road and difficult work at \$100,000 per mile				450,000
				2,010,000
Total cost of short tunnel				2,990,000
				91,925,380

Estimate of cost of road from Breckinridge to Vancouver, via Fort Union, Fort Benton, Cadotte's Pass, Cœur d'Alène Mission, north of the Cœur d'Alène Lake, and the Dalles. Entire distance, 1,526.60 miles.

	Miles.		Per mile.	
From Breckinridge to fork of line to Vancouver as by A	1,303.60		.....	\$67,352,880
Thence to crossing of Columbia	20	at	\$45,000	900,000
Thence to Dalles	113	"	60,000	6,780,000
Thence to Vancouver	90	"	100,000	9,000,000
	1,526.60			84,032,880
Steamers on the Missouri and Columbia				1,500,000
Reservoirs, aqueducts, &c.				2,000,000

Depots and permanent fixtures	\$1,750,000
Engineering and contingencies	5,000,000
	94,282,880

Estimate of cost.

	Miles.	Per mile.	
Of branch road from Vancouver to Seattle	172	at \$50,000	\$8,600,000
Depots			150,000
Total cost of road			8,750,000

Recapitulation of cost of road from Breckinridge to Seattle, with a branch road to Vancouver, and a branch road from Vancouver to Seattle.

	Miles.	
From Breckinridge to Seattle	1,543.60	\$94,915,380
Branch to Vancouver	223.00	16,930,000
Branch from Vancouver to Seattle	172.00	8,750,000
		120,595,380

Estimate of cost of road, as per A. and B., leaving the route on Sun river, passing up that river to Elk Fork, thence along that fork to Lewis and Clark's Pass, and thence to its junction with the Big Blackfoot.

The cost from Fort Benton to Hell-Gate, (crossing to Fort Owen,) as per preceding estimate, is \$15,858,390. Distance, 198.25 miles.

The cost for this portion of the route, by Lewis and Clark's Pass, will be as follows:

	Miles.		
Fort Benton to Sun river	55½	at \$55,000 per mile,	\$3,027,500
Thence to ten miles above Forks	48	" 45,000 "	2,160,000
Thence to entrance to tunnel	19.121	" 100,000 "	1,912,100
Tunnel	2.129	" 120 per foot,	1,348,934
Thence to entrance into Big Blackfoot	11.875	" 55,000 per mile,	653,125
Thence to Hell-Gate, (crossing to Fort Owen,)	86.5	" 60,000 "	5,190,000
	223.125		14,271,659

By taking Lewis and Clark's Pass, as above, the distance is increased 24.875 miles, and the cost diminished \$1,586,731.

The route by the Missouri to the mouth of Sun river will increase the cost over the route by the plateau from Fort Benton to Sun river, as follows:

REPORT AND ESTIMATE.

	Miles.			
Fort Benton, via Missouri, to Sun river.....	52 $\frac{1}{2}$	at \$80,000 per mile,		\$4,200,000
Thence up river to where route over plateau strikes it.....	10 $\frac{1}{2}$	" 45,000 "		472,500
	63			4,672,500
Over plateau—				
Fort Benton to Sun river	55 $\frac{1}{2}$	" 55,000 "		3,027,500
Increase of distance and cost.....	7 $\frac{1}{2}$			1,645,000

GENERAL RECAPITULATION.

Breckinridge to Seattle.

	Distance.	Cost—long tunnel, Cascades.	Cost—short tunnel, Cascades.
Plateau route, via Cadotte's Pass.....	1,543.6	\$94,915,380	\$91,925,380
Plateau route, via Lewis and Clark's Pass....	1,568.475	93,328,649	90,338,649
Missouri and mouth of Sun river route, via Cadotte's Pass.....	1,551.1	96,560,380	93,570,380
Missouri and mouth of Sun river route, via Lewis and Clark's Pass	1,575.975	94,973,649	91,983,649

Breckinridge to Vancouver.

	Distance.	Cost.
Plateau route, via Cadotte's Pass	1,526.6	\$94,282,880
Plateau route, via Lewis and Clark's Pass.....	1,551.475	92,696,149
Missouri and mouth of Sun river route, via Cadotte's Pass.....	1,534.1	95,927,880
Missouri and mouth of Sun river route, via Lewis and Clark's Pass	1,558.975	94,341,149

CHAPTER VI.

COMPUTATION OF ALTITUDES FROM BAROMETRICAL OBSERVATIONS.

INSTRUMENTS.

The barometers used in the different expeditions were four of Green's cistern barometers, viz: Numbers 1, 006, 770, 725, 722, and three of Green's syphon barometers, viz: Numbers 782, 769, and 767. The cistern barometer, number 722, was called a standard barometer, but was found, on examination by Mr. Doty, to be out of order, and was accordingly rejected. The instrument 1,006 was used on the trip to the Blackfoot council. Its index error, as determined at Fort Benton by a comparison of it with the two syphon barometers, numbers 769 and 782, was $+.025$.

This instrument was the only one whose index error was determined; the others have, therefore, been assumed as correct.

The instrument used by Mr. Doty in making the observations on his trip to Birch river, and by Private Lint, on his trip through Lewis and Clark's Pass, was instrument number 776. The observations made with the other barometers have been already given in the first volume of the Pacific Railroad Explorations.

In preparing the observations for computation the observed readings were severally reduced to what they would have been had the temperature been 32° Fahrenheit, which was done by means of the tables of Mr. A. Guyot, published by the Smithsonian Institution. The correction for instrument error were next applied wherever ascertained.

The field books of the explorations of the main party in 1853, in which were kept the records of many important observations, were unfortunately lost on their way from Washington Territory to New York, and we are thus deprived of all means of determining, by data actually obtained on the survey, the corrections for hourly and abnormal oscillations in the barometric column.

In the absence of hourly corrections the following table, given by Lieutenant H. L. Abbot, of the Corps of Topographical Engineers, in volume VI, Pacific Railroad Explorations, p. 715, has been used for the observations taken on the trip to and from the Blackfoot council.

TABLE A.

Corrections for horary oscillations.

4 a. m.	— .020	1 p. m.	+ .014
5 a. m.	— .032	2 p. m.	+ .028
6 a. m.	— .040	3 p. m.	+ .034
7 a. m.	— .042	4 p. m.	+ .033
8 a. m.	— .037	5 p. m.	+ .029
9 a. m.	— .028	6 p. m.	+ .020
10 a. m.	— .016	7 p. m.	+ .013
11 a. m.	— .007	8 p. m.	+ .001
12 m.	+ .008	9 p. m.	+ .004

This table was deduced from a series of hourly observations taking during five days in the latter part of August, 1855, near the head of Des Chutes valley, Oregon Territory, at an elevation of about four thousand feet above the level of the sea, and a mean temperature of about 50° Fahrenheit. The corrections for 4 a. m. and 5 a. m. are interpolated.

The above table was deduced in this manner: The hourly barometric readings being reduced to the freezing point as before explained, a mean was taken of the whole number of observations made during the five days, six readings, which were omitted, being interpolated carefully from a constructed daily curve; this mean was called the grand mean, and from it were subtracted the several means of the observations taken at same hour during the five days, giving the variations for each hour which were minus, or subtractive, when the hourly mean was greater than the grand mean, and plus, or additive, when the hourly mean was the less.

In correcting the observations made between the 11th and 22d of May, 1854, by Mr. Doty, with Green's syphon barometer number 767, commencing at Fort Benton, thence up the Missouri as far as the mouth of the Sun river, to the Rocky mountains and along their eastern base as far as Badger river, where the instrument was unfortunately broken, the corrections for hourly variations were deduced from a comparison of simultaneous observations made at Fort Benton with the table of horary oscillations furnished by Lieutenant Abbot. The hours of observation at Fort Benton being at 7 a. m., 2 p. m., and 9 p. m., a mean of the observations at these hours, during this period, was taken, and the hourly variations for the hours of 7, 2, and 9 determined in the manner before stated, which were compared with the variations for the same hours in the table of Lieutenant Abbot, and the intermediate variations interpolated. The following is the table:

TABLE B.

Corrections for horary oscillations.

4 a. m.	— .005	1 p. m.	+ .007
5 a. m.	— .017	2 p. m.	+ .020
6 a. m.	— .025	3 p. m.	+ .029
7 a. m.	— .027	4 p. m.	+ .033
8 a. m.	— .024	5 p. m.	+ .030
9 a. m.	— .020	6 p. m.	+ .022
10 a. m.	— .008	7 p. m.	+ .018
11 a. m.	— .006	8 p. m.	+ .010
12 m.	+ .004	9 p. m.	+ .008

In calculating the corrections for the observations made by Sergeant Lint, on a trip from Fort Benton through Lewis and Clark's Pass, between the 7th and 17th of September, 1854, there being no simultaneous observations made at Fort Benton, the following table of hourly corrections was deduced from a series of simultaneous observations at Cantonment Stevens, made at the hours of 7 a. m., 9 a. m., 2 p. m., and 7 p. m., from which the hourly corrections for these hours were determined, and the intermediate ones interpolated.

TABLE C.

Corrections for horary oscillations.

Sunrise.....	— .015	2 p. m.....	+ .023
7 a. m.....	— .035	3 p. m.....	.040
8 a. m.....	— .021	4 p. m.....	.048
9 a. m.....	— .014	5 p. m.....	.037
10 a. m.....	— .008	6 p. m.....	.032
11 a. m.....	— .003	Sunset.....	.030
12 m.....	+ .009	7 p. m.....	.024
1 p. m.....	.012	8 p. m.....	.016

ABNORMAL OSCILLATIONS.

In preparing the observations for computation it is necessary to apply corrections for abnormal oscillations in the barometric column, which are caused by general movements in the atmosphere, which are shown, by repeated and numerous observations, to extend rapidly and progressively over large tracts of country. These corrections form a very important element in the computation of altitudes by the method of Lieutenant Abbot, and are obtained from simultaneous observations made at some fixed station in the vicinity of the field observations.

The following tables of abnormal oscillations used in the correction of the observations made by Mr. Doty in May, 1854, between Fort Benton and Badger river, along the eastern base of the Rocky mountains, and for the observations made by Sergeant Lint in September, 1854, from Fort Benton across the Rocky mountains, by Lewis and Clark's Pass to the Big Blackfoot, were obtained in the following manner: The observations made with the stationary barometer during the time occupied by the survey being all reduced to what they would have been if the mercury had been at 32° Fahr., a mean of all the observations taken at each particular hour was found, and the difference between this mean and any observation taken at the same hour was taken as the abnormal correction for the corresponding hour of the field observations.

Table D being calculated in this manner from observations made at Fort Benton in May, 1854, and table E from observations made at Cantonment Stevens in September of the same year.

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TABLE D.—*Abnormal corrections.*

Date.	7 a. m.	2 p. m.	9 p. m.	Temperature at—		9 p. m.
				7 a. m.	2 p. m.	
1854.						
May 11.....	+ 154	+ 220	+ 204	52	67	50
12.....	+ 251	+ 165	+ 124	45	63	45
13.....	+ 072	+ 105	+ 024	44	63	51
14.....	— 032	— 083	— 114	52	62	56
15.....	— 112	— 122	— 104	44	65	54
16.....	— 106	— 069	— 051	52	73	62
17.....	— 071	+ 008	+ 012	60	76	60
18.....	— 177	— 127	— 052	60	73.5	69
19.....	— 132	— 170	— 182	63	74	57.5
20.....	— 296	— 043	+ 054	59	72.5	66
21.....	+ 030	+ 062	+ 076	63	81.5	64
22.....	+ 061	+ 095	+ 126	69	87.5	66

Table E of abnormal corrections which were used in computing the altitudes from the observations made from May 11 to May 24, 1854, between Fort Benton and Badger river, along the eastern base of the Rocky mountains, was obtained as follows: The simultaneous observations made at Cantonment Stevens, at each particular hour during the above period, viz: from May 11 to May 22, being reduced to the freezing point and corrected for horary variation by the table previously given, were added together and a mean of their several sums taken, the abnormal corrections being the difference between these means and each of the several observations.

Observations were made at Fort Benton during the same period, but as they were made at the hours of 7 a. m., 2 p. m., and 9 p. m., they were useless for the purpose of comparison for determining the abnormal oscillations.

TABLE E.—*Abnormal corrections.*

Date.	7 a. m.	9 a. m.	2 p. m.	7 p. m.
1854.				
September 5.....	— .066	— .072	— .041	— .051
6.....	— .058	— .084	— .024	.....
7.....	— .062	— .071	— .044	.....
8.....	— .057	— .050	— .042	— .016
9.....	— .010	— .022	+ .069	+ .024
10.....	+ .044	+ .020	+ .013	+ .007
11.....	+ .076	+ .054	+ .053	+ .050
12.....	+ .093	+ .080	+ .038	+ .24
13.....	— .068	— .097	— .074	— .073
14.....	— .053	— .049	+ .009	+ .040
15.....	+ .058	+ .052	+ .027	— .013
16.....	— .053	— .094	— .024	+ .004
17.....	— .118	— .038	— .025	— .141

Having thus explained the various corrections which were applied to the observations, we will now consider the methods which were used in computing the altitudes as derived from the observations. The observations taken on the trip to and from the Blackfoot council were calculated by using Guyot's tables, before referred to. The mean reading of the barometer at the level of mean tide at Suisun bay, near Benicia, was uniformly assumed for the reading at the lower station, which, from an extensive series of observations, was found to be thirty thousand and fifty-seven inches, the temperature of the mercury being 32° Fahrenheit, and that of the air 64° Fahrenheit; for the upper station, the mean air temperature for the time during the survey has been used, instead of the observed air temperature. The following is an example of the method of computation:

Data for determining the altitude of Station No. 19, on the trip to the Blackfoot council on the Cœur d'Aléne river, eleven miles above the Mission, from two observations.

Date.	Hour.	No. of barometer.	Readings of barometer.	Attached thermometer.	Detached thermometer.
June 26, 1855-----	Sunset -----	1006	27.464	53	53
June 27, 1855-----	Sunrise -----	1006	27.434	53	53

Corrections applied before computation.

	Sunset, June 26	Sunrise, June 27.
Barometric reading -----	27.464	27.434
Correction for reduction to 32° Fahrenheit-----	— .060	— .060
Correction for index error-----	+ .025	+ .025
Correction for horary oscillations, (Table A) -----	+ .003	— .022
Corrected readings-----	27.432	27.377

Mean corrected readings, 27.405; observed temperature, 53.

Computation by Guyot's tables.

$$H = 30.057 \quad H' = 27.405 \quad T = 64 \quad T' = 53$$

Table I gives for $H = 30.057$ 28725.4

Table I gives for $H' = 27.405$ 26339.1

Approximate difference of level D 2386.3

$$\frac{D \times (T + T' - 64)}{900} = \frac{2386.3 \times 53}{900} \dots\dots\dots = 140.4$$

Second approximate difference, D' 2526.7

Table III gives for $D' = 2526.7$, latitude $47^{\circ} 30'$ — .6

Table IV gives for $D' = 2526.7$ + 6.6

Altitude of station, in feet 2532.7

The nineteenth station on the Cœur d'Aléne river, eleven miles above the Mission, was computed from two observations, taken at sunset and sunrise. Five other observations were also made at this station, but as they appeared to be much affected by abnormal oscillations, they were rejected, and the altitude computed from the first two observations.

Station No. 26, the last crossing of the Cœur d'Aléne river before crossing the mountain, was made on the eastward trip, and a single observation taken at 2½ p. m., which gives for the altitude 3,617 feet. This has been assumed as the best result which could be obtained; for though the party continued at the same place on the return trip and made both an evening and morning observation, the result was considered as only useful for determining the differences of altitude between this point and five other points higher up the stream, observed on the day following the evening we reached the crossing, and which are, respectively, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{1}{4}$ mile from each other.

The heights of the crossing and the several points of observation on the return trip are 3,573.7, 3,578, 3,643.7, 3,709.6, 3,810.7, and 3,834.4; giving these differences: 4.3, 70, 135.9, 237, and 260.7, between the points 1, 2, 3, 4, and 5, and the crossing; which, added to the adopted altitude of the crossing, 3,617, give for the heights of these points 3,621.3, 3,687, 3,752.9, 3,854, and 3,877.7.

At the camp of the 5th and 6th of July, on the Bitter Root river, there was a great rise of the barometer from evening to morning, the height of the column at sundown, when reduced to the freezing point, being 26.874, and at sunrise 27.090. The two observations have been combined, and the result thus deduced has been assumed as the altitude of the camp above the sea. An observation was taken near the mouth of the St. Regis Borgia river half an hour after the morning observation at camp, which was computed, and the result compared with the altitude founded upon the morning observation at the camp. Though there was a great change from evening to morning, the change for half an hour would be inconsiderable; the difference between the two latter computations has, therefore, been taken as the absolute difference between the altitudes of the two points, and it has been subtracted from the result obtained by combining both observations at the camp, and considered as the absolute altitude of the mouth of the St. Regis de Borgia.

The altitude of the stations between 103 and 114, inclusive, were determined by a comparison with simultaneous observations made with instrument No. 769 stationed on Teton river, two miles west from Fort Benton; station No. 102 was compared with an observation made 14 miles up the Tejon at 1½ p. m., where the camp was temporarily located. After taking the observation the camp was moved to about 2 miles west of Fort Benton, where it continued during the remainder of this portion of the survey. The method of making the calculation with simultaneous observations is given and explained in the prefatory remarks to Guyot's tables. The only difference between the computation of this and the other portion of the trip, being that the reading of the barometer at the Teton, during the period of these observations, was taken at the lower station, instead of the mean reading of the barometer at Suisun bay, (30.057,) which was taken at the lower station in computing the previous observations, as before explained.

The observations made by Mr. Doty between the 11th and 22d of May, 1854, from Fort Benton up the Missouri as far as the great falls and mouth of Sun river, thence up Sun river to the Rocky mountains, and along their eastern base to Badger river, were reduced to the freezing point, and corrected for horary oscillations by means of table B and table E, applied

for abnormal corrections. No instrument error is given, so the index reading has been assumed as correct.

After being corrected as above, the altitudes were calculated by the tables of Mr. Guyot, the process being somewhat shortened by the method of preparation.

The following example will show the method of computing these observations, as also the observations of Lint from Fort Benton across Lewis and Clark's Pass.

EXAMPLE.

Data for determining the altitude of Birch river, in the mountains, by these observations.

Date.	Hour.	No. of barometer.	Readings of barometer.	Attached thermometer.	Detached thermometer.
May 21, 1854	2 p. m. ..	2	25.374	76	74
May 21, 1854	9 p. m. ..		25.834	53	53
May 22, 1854	Sunrise ..		25.374	54	52

Corrections applied before computation.

	2 p. m., May 21.	9 p. m., May 21.	Sunrise, May 22.
Barometric reading	25.374	25.334	25.374
Correction to reduce to 32° Fahrenheit.	— 108	— 057	— 058
Correction for index error	000	000	000
Correction for horary oscillations	Table B, + .020	+ 008	+ 020
Correction for abnormal oscillations	Table D, + .062	+ 076	+ 061
Corrected readings	25.348	25.861	25.357

Mean of corrected readings, 25.522; mean temperature, 67.

Computation by Guyot's tables.

H = 30.057	T = 64
H' = 25.522	T' = 67
Table I gives for H = 30.057	28752.4
Table I gives for H' = 25.522	24479.4
Approximate difference of level D.	4273.0
$D \times \frac{(T + T' - 64)}{900} = \frac{4273 \times 67}{900} =$	+ 318.10
Second approximate difference D'.	4591.10
Table III gives for D' = 4591.10, Lat. 48° 10'	— 1.30
Table IV gives for D' = 4591.10	+ 12.8
Altitude of station, in feet.	4602.6

the observed corrections. No instrument error is given, as the index reading has been assumed as zero.

After being corrected as above the altitudes were calculated by the tables of Mr. Goyen, the process being somewhat simplified by the method of computation.

The following example will show the method of computing these observations, as also the observations of that from Fort Weston across Lake and Clark's Pass.

EXAMPLE

Index for altitudes at Fort Weston, N. H., 1851, as determined by the observations.

Date	Time	No. of barometer	Barometer reading	Reduced to sea level	Index for altitudes
Aug. 21, 1851	2 p. m.	1	29.974	29.974	0.000
Aug. 22, 1851	2 p. m.	2	29.981	29.981	0.000
Aug. 23, 1851	2 p. m.	3	29.971	29.971	0.000

Corrections applied before computation.

Barometer reading	Correction to index to 32° Fahrenheit	Correction for index error	Correction for barometer	Correction for thermal coefficient	Corrected readings
29.974	— .001	0.000	— .001	— .001	29.972
29.981	— .001	0.000	— .001	— .001	29.979
29.971	— .001	0.000	— .001	— .001	29.968

Mean of corrected readings 29.972; mean temperature 61.

Computation by Goyen's tables.

$H = 30.057$ $T = 61$
 $H = 29.979$ $T = 61$
 Table I gives for $H = 30.057$ 4272.4
 Table I gives for $H = 29.979$ 2412.4
 Approximate difference of level $D = 4272.4 - 2412.4 = 1860.0$

$$D \times (T + t) = 1860 \times 61 = 113460$$

$$113460 \div 300 = 378.2$$

 Table III gives for $T = 35.0110$, Lat. 42° 10' 1.30

$$378.2 + 1.30 = 379.5$$

 Altitude of station, in feet 3795.0

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PART II.

THE UNIVERSITY OF CHICAGO

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PART II

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No. 1.

REPORT ON THE BOTANY OF THE ROUTE.

By J. G. COOPER, M. D.

THE CASCADE MOUNTAINS.

The most superficial examination of the natural productions of Washington Territory cannot fail to show that it possesses a remarkable variety of botanical and zoological regions, each distinguished by more or less peculiar forms of life. A concise and systematic account of them, as far they fell under my observation, seems necessary to complete the scattered notes on the distribution of species which I have already given. Reversing the usual order, I commence with the most elevated region, which was one of the first I visited.

At an elevation of 5,000 feet above the ocean we found the vegetation and animals *subalpine* in character, but still with a preponderance of those belonging to the lower country. On the hills, there but partially covered with forests, we found, during our visit in the first week of August, a profusion of berries of several kinds, which the Indians were engaged in collecting. Among them was a huckleberry not before seen, (*V. myrtilloides*? Michx.,) with fruit nearly as large and as finely flavored as a grape. Two kinds of pine, (*P. monticola*, Dougl.,) resembling the white pine, and (*P. ponderosa*, Dougl.,) with a magnificent species of mountain spruce, (*A. nobilis*, Dougl.,) were the characteristic trees, replacing, to some extent, those of the lower regions. Blue, purple, red, yellow, and white flowers, in rich profusion, ornamented the surface; and the whole region looked more like a garden than a wild mountain summit, covered for nearly half the year with snow.

On the morning of August 9, a rain having extinguished the burning of the forests below us, and cleared away the smoke which had for several days obscured the view, there was revealed to us a scene probably unsurpassed in magnificence by any in America. Five snowy peaks surrounded us, rising many thousand feet above our camp; and we found that we were still far below the limits of perpetual snow. From a distant view I supposed that dwarf vegetation continued on these peaks for a thousand feet higher, forming the truly *alpine region*, and I much regretted that time did not permit me to explore this. Months might be well spent in collecting in this most interesting region, even above the limits of the forest growth. It is well known to have even a group of large animals peculiar to it—such as the mountain sheep and goat, white grouse, and probably others. A dwarf glaucous juniper, (*J. communis*,) with large berries, spreading like a carpet on the summit of the highest point I ascended, was the most characteristic subalpine plant, and seemed to be limited to that region, as none occurred lower down. This point was, by the barometer, nearly 5,103 feet above the sea. The vegetation of August, at this height, corresponded to that of May at Vancouver, many of the same plants occurring in flower, though of a more stunted growth. But spring, summer,

and autumn are so crowded into the space of three to five short months that even the subalpine region may be said to have but two seasons—first, that of vegetation, and secondly, winter, continuing for the rest of the year, while the ground is covered with snow. Though the days were very warm during our stay there, ice formed at night one-third of an inch thick at our camp; and we had a violent and cold hailstorm, which for a short time buried the flowers, thus in an hour changing summer into winter.

The precise limits of the seasons cannot be definitely fixed, and probably vary much in different years and on the different exposures of the mountains. About the 12th of the following October snow fell in the Naches Pass during Lieutenant Hodge's journey across it, its elevation being nearly the same, 4,890 feet above the sea. Snow is known to fall at this height in every month between September and May, but it does not lie constantly for so long a time, and vegetation probably goes on during both those months, and even for a month or two longer. But the local differences are very great and must amount to a month or more, according to the exposures of surface to sun and rain even at the same elevation. There is no *dry season* at this height, as clouds are almost constantly hovering about the peaks, and rain can be seen even from the valleys below, falling at all seasons, especially on the more westward parts of the range.

I found animals more abundant in this cool elevated region than below. The large herbivorous quadrupeds had sought the fresh spring-like herbage, and were probably followed by many beasts of prey. Ducks, geese, and cranes abounded, with the interesting little phalarope, seeking these cool regions to raise their young; but in our hasty journey across I could merely glance at the multitude of new beings which surrounded me.

The moist hollows between the mountains were densely covered with rank grass, promising rich pasturage for the herds which, when the country becomes more settled, will doubtless be driven there during the summer, when the plains eastward are parched by drought. In healthiness and in beauty of scenery these mountains cannot be excelled.

On the 11th of August we commenced to descend the eastern slopes of the Cascade range near the base of Mount Adams, and at once found ourselves in quite a different natural region from any before seen. Although forests continue as on the western slopes, they are composed of entirely distinct species of trees, and have a very different appearance. Instead of spruces, one pine almost exclusively prevails, (*P. PONDEROSA*, called "Yellow Pine,") growing usually over a hundred feet high, with a straight clear trunk three to five feet thick, branching at the height of about forty feet. Its bark is thick, reddish, and deeply furrowed, like that of the chestnut. The wood is said to be unusually heavy and useful for many purposes, besides being excellent fuel. A few of the smaller "White Pine" and stunted larches are mixed with this on the higher parts of the slope, and descending below, about the elevation of 3,500 feet, the oak began to reappear.

There is a little underbrush in these forests that a wagon may be drawn through them without difficulty, forming a striking contrast to the dense thickets of the western slopes, to be hereafter described. The level terraces, covered everywhere with good grass and shaded by fine symmetrical trees of great size, through whose open light foliage the sun's rays penetrate with agreeable mildness, give to these forests the appearance of an immense ornamental park. Almost the only shrub is a *Ceanothus*, (*C. VELUTINUS*, Dougl.,) with beautiful shining foliage, and a strong aromatic odor something like cinnamon, growing in scattered thickets.

This beautiful forest continued for about twelve miles eastward from Mount Adams. It

occupies a zone along the eastern side of the mountains between the heights of 2,500 and 5,000 feet at the Columbia river, and becoming lower as we go northward, until at Fort Colville and on the Okanagan river, at latitude 49° , it extends quite down to the level of the rivers, occupying all the surface except some small prairies in the valleys.

At the mountain gaps of the Columbia and Yakima rivers trees also extend further down along the streams, but in small numbers. The well marked and usually abrupt lower limit of these forests evidently corresponds to the degree of moisture derived either from the rains of the mountain summits, or from the rivers. The moist winds from the ocean, intercepted by the highest ridges, pass through the two gaps above mentioned, and to a small extent favor the growth of trees lower down. Doubtless the cessation of fires on the dry plains will be followed by a further increase of forests in such places.

North of latitude 48° , the country being generally hilly, is better supplied with rains; and on the *northern* slopes of the hills I observed dense forests, while frequently their *southern* exposures were bare, showing the direction of the prevailing winds and consequent moisture. This fact was also noticed by others among the eastern spurs of the Rocky mountains. The same effect is well marked southward on Cape Mendocino, in California; while thirty miles south of San Francisco trees almost entirely of a distinct and southern group grow chiefly on the *southern* slopes, indicating a corresponding difference in the direction of the moist winds.

The dry season was already far progressed, and I found, therefore, but few plants in a condition for preservation, though those collected happened to be of peculiar interest.—(See *Phælipœa comosa*, *Erigeron Douglasii*, *Pæonia Brownii*, *Spraguea umbellata*, *Acer glabrum*, &c.) The entire vegetation seems to belong to the Rocky mountain group much more than that of the western slopes, although several of the plants are, as far as known, peculiar to this range and the Sierra Nevada.

A corresponding group of animals also first appeared there, such as the coyote, badger, and Say's striped squirrel; but large game continued very scarce, and the season was unfavorable for birds, which seemed to have almost all deserted these forests during August.

To complete their description, I extract from my journal the notes on these forests as they appeared further north, and at later seasons.

On September 13 I rode from the camp on the Yakima about fifteen miles up its valley, and found the forest commencing about six miles up, at an elevation of about 2,200 feet, as abruptly as where we left it before, with exactly similar vegetation and the same dreary absence of animal life.

On the 20th the expedition crossed the ridge separating the waters of the Yakima and Pisuouse rivers. There, 5,750 feet above the sea, we found a scattered belt of forest, in which the larch (*L. OCCIDENTALIS*, *Nuttal*) appeared, of great size, and about equal in abundance with the pines. This magnificent tree sometimes excels the latter in size, and its feathery foliage, just beginning to fade yellow, gave it a beautiful appearance in contrast to the deep green forest around it. With these were a few scattered spruces of several species, which I could not well determine, finding no cones.

From the summit of this ridge we had a panoramic view of a vast extent of country on all sides of us. Towards the west the numberless irregular peaks of the Cascade range looked like the confused waves of a rough sea. Below their highest snow-capped peaks the belt of forest could be plainly seen extending down on spurs to the Columbia, but crossing it only at a far distant point near the northern boundary of the "Great Plain," which extended eastward

as far as we could see. But large portions of the ridges west of the river were also bare of trees to an apparent height of about 3,000 feet. Further north we met with none but scattered patches of forest, until reaching the high ridges bounding the vallies of the Methow and Okanagan rivers, where, as well as along their banks, trees are grouped in beautiful groves, forming a sufficient supply for the population which must in time inhabit these picturesque valleys.

I have already noticed the prevalence of the forests near the 49th degree along the Columbia, and most of the country thence south to latitude $38^{\circ} 30'$ is occupied by them.

From Fort Colville, southward, to the Spokane river, we found a pleasing country of mixed forests and prairies, with a fertile soil, which is evidently in part due to the intermingling of spurs of the Cascade mountains with those of the Bitter Root range, which appear towards the east well covered with forests on their higher parts. They intercept and precipitate over these northern tracts sufficient moisture to make them highly fertile.

The lowest points on the Great Plain where trees are found in any abundance are about 2,000 feet above the sea. This most elevated division of the great forest regions of the Territory, covering only the mountain slopes and summits, botanically and zoologically constitutes a southward extension of the more northern flora and fauna following the mountain ridges, and thus irregularly interlocking with the third great region of plains. Towards the east and south a dryer climate is found to diminish the extent of forests, until gradually rising higher and higher towards the line of perpetual snow, at length they almost disappear on some of the eastern slopes of the Rocky mountains and on the ranges of southern Oregon and Utah.

GREAT PLAIN OF THE COLUMBIA.

Although the great forests west of the Cascade range might most naturally follow in the description of regions after those just mentioned, being allied to them in products and in relation to climatic agencies, I prefer to give here the brief and incomplete observations which I was able to make during our journey over the Great Plain, occupying the central portion of the Territory.

This region, characterized by an entire absence of trees, occupies an intermediate place in elevation between the mountain forests and the lowlands. Though its name gives the impression of a surface uniformly level, it has (as remarked in my preliminary report) its mountains and valleys, which cannot be separated by any peculiarities of natural products, and must, in a technical sense, be considered as a part of the "plains" region. Thus, on the divide between the Yakima and Piquouse, I noted that the forests did not appear until near its summit, at nearly 5,000 feet elevation.

East of Mount Adams the greatest height of the woodless ridges is 3,000 feet, at the Spokane river about 2,600 feet, and the lowest point near the centre of the Columbia plain, at Walla-Walla, is 409 feet above Vancouver. Though the cañon of the Columbia is cut down through the elevated plain to the level of 119 feet at the Dalles, the general surface around is much higher, and at the lower points there is little doubt that trees would grow freely if protected from fires, being encouraged by the constant supply of moisture carried through the gap of the mountain by the prevailing strong west winds.

I may therefore assume an average elevation of from 500 to 2,500 feet for the dry region of the central portion of the Territory, where *trees* will not grow without artificial irrigation.

This *Great Plain of the Columbia* is bounded on the north by an irregular line running between the parallels of 48° and 49° , north of which it is presumed that but few branches of it extend,

the country becoming very mountainous, and therefore well wooded. Southward it is continuous with the central plains of Oregon, through them with those of Utah, and through the South Pass with the vast plains extending eastward to the Mississippi river.

In order to show the peculiarities in the vegetation of the plain region, I have included the plants collected there in a separate list. Though made at an unfavorable season, and few in number, they show a marked dissimilarity from those obtained west of the mountains, yet many of the latter belonging to the *prairies* west of the mountains are also known to be found on the *plains* of the central districts.

One peculiar group of shrubs represent in this region the forest trees, and are characteristic of all the plain regions between the eastern base of the Rocky mountains and the Pacific. (*Purshia tridentata*, *Artemisia tridentata*, *Linosyris albicanlis*, *L. viscidiflora*, *Sarcobatus vermicularis*.)

As the most characteristic animals, I refer to the badger, coyote, or barking wolf, cock of the plains, or sage fowl; sharp-tailed grouse, or prairie chicken, and other smaller kinds, mentioned more particularly elsewhere. The antelope, buffalo, prairie dog, and some others found in other parts of the plains, doubtless are sometimes to be met with in this Territory, though we neither saw them nor heard of them as being common.

The various divisions of the plains due to differences of elevations, soil, and moisture, have each their peculiarities, which would require a long description, had my opportunities been sufficient to make it complete. A short notice of the most striking may not be without interest here.

The high ridges forming spurs of the Cascade range, extending with a gradual slope from the pine forests down to the Columbia on each side the Yakima valley, between its branches, are too dry to serve as anything but a grazing region. Some portions near their summits are also very rocky and barren, but these are comparatively small. The greatest obstacle to cultivation is the absence of means of irrigation, but there can be little doubt of the success of winter grains on many parts of these ridges. The Spokane plain, between that river and the Snake, west of longitude 118°, resembles, in soil and elevation, the lowest part of these ridges, being from 500 to 2,500 feet in elevation. But being a great plateau, it has the advantage of retaining moisture, and in many parts are tracts sufficiently irrigated naturally for general cultivation. Alkaline lakes and marshes, and some very rocky portions, are all that cannot be made use of, but these seem to occupy comparatively a small extent of it.

On all the branches of the northern Columbia crossed by us we found valleys of various extent, which form the best portion of the plain region. Terraces varying in height from five to two hundred feet above the water border these valleys, and present various soils, from the very dry gravel of the ridges down to the fertile alluvium of the river banks. The change in the native vegetation from one to another of these is very remarkable, indicating an adaptation for various crops. Long rank grass covers the moister portions of the bottoms, and there is always some timber close to the water, except towards the mouth of the Yakima. Those valleys north of latitude 48° are doubtless the best in soil and climate, crops doing admirably at Fort Colville without any irrigation.

The lands immediately along the Columbia itself, from just below the mouth of the Spokane to near the Dalles, and all the adjoining region below the elevation of about 2,000 feet, seem available only for grazing without the assistance of irrigation. But it has, as well as the higher valleys, great advantages for effecting this object in the terraces which often

partially form a dam, and, with the immense and inexhaustible timber on the mountains, can be made to retain a supply of water both for this purpose and to assist in navigation in the mode suggested by Mr. Ellet, in the Smithsonian Contributions, for improving the navigation of the Ohio. The natural accumulation of alluvial soil in the lowest places would, without doubt, make the banks of this river the most fertile instead of the most barren of all, were it not for the extreme dryness of the climate. Like the rich valley of the Nile, it may, by irrigation, hereafter support a population as great and flourishing as that of Egypt in her palmiest days. It has also the advantage that the worst land of the Great Plain is far superior to the deserts which border the Nile valley. In the chapter on the climate of the country along the route this question of cultivation will be found more fully discussed, and compared with other countries.

The relations of climate to the natural productions of the central division of the Territory are very interesting, and although the data are still incomplete, they show that moisture must be the only thing wanting to produce a luxuriant vegetation.

There being little rain, of course snows must be light, but, north of latitude 48° , begin early and cover the ground throughout winter, forming an excellent protection for winter grains, besides advantages for travelling, and do not become so deep as to prevent grazing. While at Fort Colville, as early as October 24, we had a fall of about six inches of snow, almost the first storm of the season. This, however, melted off in twenty-four hours, and we found that south of the Spokane river it had been replaced by rain. After October 1 there is a fall growth of grass, especially where the surface has been burnt over, and we found the hills near the Okonagan, in October and near the Walla-Walla in November, covered with the richest green herbage. As early as February 19, 1854, Lieutenant Grover found the grass "springing up plentifully" on the Spokane plain, while the forests he had just left north and east of that river were still obstructed by deep snows. The *growing season* begins and ends early, extending from about March 1 to June, like that of the fertile valleys of California.

The time during which I collected on the central plains of the Territory, extending from August 16 to November 17, was the worst period of the year for that purpose. Yet in the small collection of eighty species of plants there are two new ones, (*Astragalus seratinus* and *Malacothrix crepoides*,) besides several others of interest, showing that at more favorable seasons the botanist may still obtain novelties in a field already more explored than any other west of the Rocky mountains. Among mammals, all kinds of which were scarce, I can only mention one as new, (*Hesperomys austerus*.) Of birds, one is new, (*Podiceps occidentalis*,) others scarcely before known, (*Picus alpolarvatus*, *Sittapygmaea*,) although I never saw a region so poor in these animals during summer. After October the fall migration began to bring southward many interesting species, which our rapid travelling during the short days did not allow me time to collect.

Dr. Le Conte has found several new insects among those obtained there, and the few reptiles and fish I succeeded in preserving furnish several new and interesting species.

REGION WEST OF THE CASCADE MOUNTAINS.

I now return to the western region of the Territory, including the entire surface west of the Cascade range, which I have left for the last description because it occupies the lowest portions of the Territory, and because my residence in it of two years gives me the means of describing it the most fully. Occasional extracts from my journal may show its striking peculiarities in a stronger light than mere methodical description alone. In descending the Columbia from the

Dalles, on November 17, we found the mountains to rise very rapidly in height and become suddenly densely wooded; the trees observed being usually of the species prevailing on the western slopes of the range.

This great mountain gap, unequalled in depth and extent by any on the continent, presents in some parts the perpendicular walls of the *cañon*, in others the gradual slopes of a narrow valley.

Even from the Dalles we could perceive a thick fog hanging in the gap, but were quite unprepared to find a heavy rain, which we entered long before reaching the Cascades, and which continued unceasing during the whole day and night following, when we reached Vancouver. Even after entering this rain we could see the bright unclouded sky of the plains eastward, but I thought the moist and milder air more agreeable than the cold dry climate we had just left. The change in the appearance of the country in the distance of a few miles was almost as great as I have since observed between New York and the isthmus of Panama in January, as we left the ground at the Dalles covered with snow, and entered a region of perpetual spring, with gigantic evergreen forests, tropical looking shrubs, and large ferns, where several spring flowers were still blooming. Even the perpendicular rocks supported a green covering of mosses, &c., over which cascades, unbroken for a thousand feet, fell from the mountains directly into the river.

This change in the character of the scenery, so strongly observable in passing from the central plains to the western region, prevails over the whole of the latter, though less marked in portions of a drier climate. The "Cascades" are noted for rain, which prevails there at all seasons, being caused by the precipitation among the surrounding cold mountain summits. This moisture assimilates the vegetation of the gap to that immediately on the coast, and the shores of the Columbia everywhere below show less of the regional peculiarities than are observed a little distance from them.

These, though not sufficiently extensive and well marked to constitute *regions*, are yet divisions important enough for separate descriptions. As a whole, the region has a surface mountainous and hilly, interspersed with fine valleys lying between the level of the sea and an elevation of about 2,000 feet at the summits of the Coast range, and perhaps somewhat more on the western slopes of the Cascade mountains.

PRAIRIES OF THE WESTERN REGION.

The first division which I shall describe is that of the prairies, which naturally follow after the central plains, of which they may be considered branches, closely similar in vegetation, and, to some extent, in animal products. They form, too, the division most important to the settler, who, in the western section, finds the *absence* of trees as desirable as is their *presence* in the open country of the interior. The prairies generally occupy the lowest lands only, and are divisible into several kinds, differing in soil, vegetation, elevation, and in the causes which produced them. To commence with the lowest, we find about the mouths of rivers running into the ocean extensive tracts of "tide-lands," resembling the salt meadows of the eastern coast, but much superior in soil and products. They are overflowed by the tide only at its highest periods about two or three times annually, and this may be easily and entirely prevented by embankments. At all other times they may be traversed without difficulty, and are so dry as to produce excellent vegetables of many kinds. Potatoes and almost all garden vegetables succeed abmirably with a little care, and even good crops of wheat have been raised on

them.* Naturally they produce luxuriant crops of grass from two to four feet high and of fine quality, which is green all summer, affording excellent pasturage at the very time when the upland prairies are dry and parched. The floods that do occur are in winter, when they do little harm.

Such tide prairies are most extensive about Shoalwater bay and near the Straits of Fuca. They are less extensive up the sound and on the Columbia and Chehalis, where the water is fresher, and are often covered with a dense growth of small spruces, crab-apple, and other bushes.

Ascending through these to the waters entirely fresh, we find on the Upper Chehalis and Columbia, near Vancouver, tracts of meadow lying below the line of summer inundation, and therefore overflowed in many years from June to August. This has been the greatest obstacle to their cultivation, until the plan was adopted of waiting for the floods to subside, after which crops are found to flourish quite as well as if put in the ground earlier. Embanking is only partially successful, as the water soaks up from below. In most years, however, the flood produced by the melting snows is so short and partial as to be of more service than injury. The soil is very productive, and most of the plants similar to those of the tide lands. Between these meadows and the rivers there is usually a ridge, rarely overflowed and covered with trees, which conceal the view of the prairies from the water. The absence of trees is on all these evidently due to their occasional inundation either by salt water or the ice-cold flood from the mountains.

Small prairies, constantly marshy from springs, are found about the heads of rivers, especially among the mountain summits, which produce either a tall, coarse grass, or, where drier, are covered with thickets of low bushes. Such are the cranberry marshes along the coast, where we find precisely the same group of plants as on the mountains 5,000 feet higher, as well as in the most northern parts of this continent and other parts of the world.

The next and a more interesting kind of prairies consists of those which are constantly dry. These are perhaps less rich than the preceding, though varying in this respect. The best are those occupying the river bottoms about Shoalwater bay, the Chehalis, and small rivers running into Puget Sound. On Whidby's island, and other places adjoining the Straits of Fuca, are similar rich prairies, with the appearance of having been formed by a similar alluvial deposit from rivers, though now more than a hundred feet above the water. The rich, black soil is on all these from one to three feet deep, and almost entirely vegetable in composition. It of course produces every thing adapted to the climate in luxuriant profusion, though often too rich for grain, especially in the moist climate west of the Coast range. Prairies, with a drier and poorer soil, exist in a narrow strip along the sandy sea-beach, and at an elevation of several hundred feet above tide-water about the head of Puget Sound, where their soil is either sandy or gravelly, producing the same plants as those near the sea-beach, and mostly quite different from those of the rich alluvium.

I give some extracts from my notes to show the general appearance of these prairies at different seasons, and at the same time some idea of out-door life in the Territory.

March 26, 1854, I made an excursion in a sailboat up the Willopah, a river running into the north end of Shoalwater bay. "I was more pleased with this little river and its valley than with any I had yet seen. It has not, of course, the grandeur of the Columbia, but the variety

* In Nova Scotia lands precisely similar, but more subject to overflow, form the best agricultural tracts of the province.—
(Dawson's *Acadian Geology*.)

and rich luxuriance of vegetation is more striking as we pass close along the banks, and at every bend are new scenes of rural beauty as pleasing because uncommon in a new and wild country. For ten or twelve miles meadows, covered even now with fine green grass, occur alternately on either side, with intervening points of higher land covered with trees. Above the limits of tide-water is a change in the vegetation and surface, the upper valley being composed chiefly of the richest prairies, surrounded by the usual dense forests."

On the 18th of July following I went with a party to explore a route through this valley to the sound. "Very few of the Indians knew anything of the trail, as it had not been used for twenty years, or since the whole tribe of Willopahs inhabiting the valley were exterminated by smallpox. Reaching the first prairie, at the head of tide-water, we loaded a pack-horse with our provisions and blankets, and, each equipped with axe or gun, started on our pedestrian adventure. The morning was delightful; the prairie covered with grass full three feet high and adorned by a great variety of flowers. It yet scarcely showed any effects of the dry season which was just commencing. Ten of these prairies, varying from a quarter of a mile to a mile in extent, occur in this valley; their soil excellent and surface generally level, though sometimes undulating, and making the most beautiful of farms with scarcely any labor. The rest of the valley is also excellent in soil, but covered with trees, and along the river bank sometimes overflowed in winter."

Crossing the Coast range (to be hereafter more fully described in the account of the forests) we soon struck prairies on the upper Chehalis river. Here the gravelly soil characterizing the whole valley between the Coast and Cascade ranges, together with a drier climate, had produced much more of the effects of the dry season than in the Willopah valley, and the grass, naturally shorter, was quite brown, while a very distinct group of flowers, still blooming in abundance, made it seem as if we had in the distance of a few miles reached an entirely new country. I recognized at once the characteristic plants of the dry prairie near Vancouver and along the Cathlapoot'l river, where the preceding summer I noted, in July, that "we passed through, in the distance of fifty miles, seven prairies from one to four miles in width, generally with abundant grass, rich soil, and forming a charming contrast to the almost impenetrable forests."

We rested a day at "Boisfort prairie," so called by a Canadian settler, the name being a French translation of the Indian name of the oak, which first appears here in going eastward. "It is one of the most beautiful of the little prairies we meet, like oases, in this wilderness of forest. Oval in form, about two and a half miles long by one in width, its surface gently undulating in long, terraced slopes. Near its centre stands a remarkable mound, conical and about fifty feet high, probably formed by the action of water, though looking very much as if built purposely by ancient inhabitants for a citadel.

"The fine fields of grain just ripe, numerous cattle, and comfortable houses, with all the pleasant appliances of rural life, gave the place the air of an old settlement, although the twelve families there had been settled less than a year."

At short intervals, all along the upper Chehalis, and beyond it to Steilacoom, we passed through similar fine prairies, which occupy a large portion of this valley between the Coast and Cascade ranges.

The "Nisqually plains," about thirty square miles in extent, lie in irregularly oval form between Puget Sound and the Cascade range, with the Nisqually river on the south and the Puyallup north of them. Their surface is smooth and level, rising in successive terraces from

ten to forty feet high, and generally parallel to the mountains. At short intervals occur lakes, small but beautifully clear, though usually without visible outlet, the gravelly soil rapidly absorbing the water during the dry season. Few, however, dry up completely, and they become neither muddy nor stagnant, thus indicating, perhaps, a subterranean flow. Around these are beautiful groves of poplar, aspen, ash, maple, and a few pines and oaks. Scattered over the surface are rounded hills, looking like islands in the level plain, and covered with groves of the usual fir, which also sometimes grows on the slopes of the terraces. The whole plain looks like a magnificent park ornamented by the highest skill of the landscape gardener, while to the southeast, and in full view from all parts of it, stands the majestic Mount Rainier, forty miles distant, though in appearance not more than five.

On the much-discussed subject of the mounds so abundant on the prairies about Puget Sound, I must make a few remarks, since Mr. Gibbs has suggested that they might have been produced by the immense growth of the "giant root," (*Megarhiza Oregana*,) forming a nucleus around which the soil has been gradually washed away.—(Vol. I, p. 469.) I have noticed this plant quite as often on level ground and in hollows as on these mounds, and have found deep *cavities* where its roots have decayed. I cannot, therefore, consider it a cause any more than roots and stumps of other kinds, which never produce mounds so symmetrical and uniform as these are found. I would suggest that they may have been produced by *eddies and whirlpools*, probably at a time when this sound formed the estuary of a great river like the Columbia, or perhaps were branches of the great system of northwest sounds, which extends from the Columbia river to Sitka, or further. I have seen such whirlpools in the narrow inlets of the sound, during the violent ebb of the tide, that seemed to me quite capable of thus raising mounds of gravel, just as is done by the eddies of the wind with the light sand along the sea shore and on the plains. Any vegetable origin must be quite inadequate to produce such mounds as I have seen along Black river, which I believe were never seen by Mr. Gibbs. There they stand so close together that it is impossible to walk between them without stepping on the adjoining slopes, and, while standing at their bases, I could not see over them. Such covered the surface for miles near the western border of the prairies, there being none in the adjoining forest. Their form, as is there most distinctly marked, is very perfectly circular; height from a scarcely perceptible swell to eight feet, and diameter at least six or eight feet. Their leaves do not coalesce, though close together when they are well marked. The low ones seem to have been partially covered, so as to conceal their bases, and form level intervals between the summits that still protrude.

NOTE.—Mr. Gibbs, in his Geological Report, dated two months later than the above reference, (Vol. I, p. 486,) says that their origin "is clearly due to water."

In a journey up the Chehalis and down the sounds to the Straits of Fuca, in March, 1855, I found vegetation as far advanced as is usual in May at New York. Strawberries, &c., were beginning to flower, and many summer birds had arrived, including the delicate humming bird, swallows, and warblers. Indeed, the mildness of the winters makes the prairies more green and beautiful at that season than in summer, and up to the end of December, 1853, I found several flowers still blooming about Vancouver.

Many of the richest prairies are much injured by a dense growth of fern or brake, which grows on them eight feet high, and as it also occurs about two feet high on the poorer soils, becomes a sure indication of richness. It is said that by cutting off for a few times at a height of several inches the stems will "bleed" to death, the sap running so as to exhaust the roots.

The other vegetation of these prairies is too varied for special enumeration here. Most of the plants found in them are mentioned in my list of those collected west of the Cascade range. Of the 360 species there given, more than 150 are peculiar to these prairies, being a very large proportion considering their small extent in comparison with the forests. It is also observable that these are of a group characteristic of the Great Plains and California, of which botanical regions these prairies form the northwestern outskirts.

From February to July they look like gardens, such is the brilliancy and variety of the flowers with which they are adorned. The weary traveller, toiling through the forests, is sure to find in them game, or, at least, some life to relieve the gloomy silence of the woods.

The narrow strip of sandy prairie along the sea beach is particularly interesting to the botanist, for there he finds many beautiful plants not seen elsewhere, which, wandering from more southern climes, meet in the adjoining cranberry marshes the cold-loving northerners before alluded to as common in the swamps.—(See *Abronia arenaria* and *umbellata*, *Orobis littoralis*, *Cymopterus? littoralis*, *Fragaria Chilensis*, *Franseria*, (two species,) *Calystegia*, *Soldanella*, &c.

A few remarks are necessary upon the origin of the *dry* prairies so singularly scattered through the forest region. Their most striking feature is the abruptness of the forests which surround them, giving them the appearance of lands which have been cleared and cultivated for hundreds of years. From various facts observed I conclude that they are the remains of much more extensive prairies, which, within a comparatively recent period, occupied all the lower and drier parts of the valleys, and which the forests have been gradually spreading over in their downward progress from the mountains. The Indians, in order to preserve their open grounds for game, and for the production of their important root, the camas, soon found the advantage of burning, and when they began this it was only those trees already large that could withstand the fires. Occasionally gigantic fir trees, isolated or in groups, show, by their immense size, that these prairies have not been produced nor always exposed to fires, for they must have attained a considerable age before they could have resisted fire.

The introduction of the horse, about the beginning of this century, was a further inducement for burning, and doubtless also caused an increased settlement in the prairies by these people, hitherto accustomed to travel mostly by water, and to depend upon fishing for their subsistence. On some prairies near Vancouver and Nisqually, where this burning has been prevented for twenty years past, young spruces are found to be growing up rapidly, and Indians have told me that they can remember when some other prairies were much larger than at present. That they never were covered with forest is shown by the perfect smoothness of their surface; while in places very completely cleared of forests by fires are always found mounds and hollows, left by stumps, and an immediate growth of shrubs and trees follows, showing a tendency to return to forest, instead of to form prairies. Great changes must have occurred in the conformation and climate of this part of the coast since forests began to cover a surface once probably as bare as that of the Central Plains.

Several kinds of animals are closely confined to these prairies or their borders. Among them are the deer, rabbit, gopher, meadow-mice, and, in less degree, probably, the sewellel, (*Aplo-dontia*,) mole, prairie-mouse, (*Hesperomys austerus*,) which seems, like the plants, to have wandered from the east side of the Cascades to Steilacoom. Wolves and foxes are scarce, compared to their numbers on the plains, while their associates there, the badger, cayote, and other species, have not been found west of the Cascades.

Few birds are strictly peculiar to them, though almost all the smaller species, shunning the dense forests, frequent their borders. The shore lark and Savannah sparrow are, perhaps, the only land birds never seen in the woods, while some waders frequent their marshy portions, with the brown crane and Canada goose, which are never or rarely seen along the sea shore. The prairie chicken, sage fowl, Oregon and California quails, are worthy of introduction.

FORESTS OF THE WESTERN REGIONS.

The forests of the western regions deserve a particular description, since, though they are less important than the prairies to the agriculturist, they are one of the principal sources of commercial wealth to the Territory.

As I believe no attempt has been yet made to point out in a systematic manner their natural characters, distribution and useful properties, I will here mention each species in the order of its importance.

It will be observed that they are nearly all of different species from those constituting the forests east of the Cascade range, though some of them are supposed to extend much further eastward, north of the Territory, as they reappear upon some of the highest parts of the most eastern Rocky mountains.

The country bordering on the lower Columbia has been celebrated ever since its discovery for the gigantic growth of its forests. Even species so nearly resembling those of the Atlantic States as to be generally considered identical attain a much greater size.

The mild climate and abundant moisture causing a longer growing season may be considered, perhaps, as one cause of this increase in size. It seems certainly to have an influence upon many smaller plants, and most strikingly so on cultivated vegetables, whose seeds we know to have been brought from the east. The great height to which trees grow may also be due to the rarity of lightning, as it is well known that thunder-storms, though common on the mountains, are very rare in the valleys.

CONIFEROUS TREES.

The tree most abundant, and therefore most characteristic of these forests, is that of which varieties are known in the Territory as "red" and "black fir," (*ABIES DOUGLASSII*.) It is, at the same time, the species most generally useful. Its foliage resembles that of the white spruce of Canada, but the leaves are larger and longer. Its cone is also very different from that of any other spruce, being ornamented with three-parted bracts between the scales, which at once distinguish it. Its trunk is straight, commonly without branches for fifty feet or more, and covered with a thick bark, resembling, in its ashy color and deep furrows, that of the chestnut. The wood is rather coarse-grained and liable to shrink, but is more used for lumber than any other, being adapted for all kinds of rough work exposed to the weather. It also forms excellent fire-wood even when green, and in dead trees the bark and wood are often so full of resin as to burn like a torch. From its combustibility extensive tracts of this forest get burnt every year, taking fire from friction or any other slight cause. During our ascent of the western slopes of the Cascade range we passed for days through dead forests, perhaps burnt by ignition from the hot ashes which were thrown out from Mount St. Helens several years before; but large tracts were on fire at the same time, filling the air with smoke, so that we could not see the surrounding country for several days. Large tracts of the eastern slopes of the Coast range are also desolated by the same cause.

The fir forms the mass of forest growth on the dry, gravelly soils, from an elevation of probably 3,000 feet on the Cascade range, entirely across the valley to the summits of the Coast range, west of which it is almost entirely replaced by another species, and it is not found at all on lands subject to inundation. It is only where it abounds that extensive tracts are found killed by conflagration.

The tree known as "yellow fir" in the country (*A. GRANDIS*) I have met with only on the sandy alluvial river banks between the Cascade and Coast ranges, to which limits I believe it is very strictly confined in this Territory. I do not know its highest limits, but suppose that the influence of salt water may determine its most western range along the rivers, as it is strictly limited by tide-water. Its foliage is denser and darker than that of the preceding, and it is a fine looking tree, growing much higher than any other, often exceeding 300 feet. This, with the shortness of its branches, which gives its top a cylindrical shape, easily distinguish it at a distance. Its wood is much finer grained, tougher and more elastic, than that of the red fir, being especially adapted for the enormous masts and spars which are now exported from the Territory even to Asia and Europe. Much lumber, of fine quality, is also made from it along the Columbia river. Its bark is thinner and finely grooved, of a pale gray hue; the cone oval, about three inches long, and destitute of the peculiar bracts of the preceding species.

The "black spruce" (*A. MENZIESII*) is the characteristic tree of the coast slope, where we find it very strictly limited to the neighborhood of tide-water, though a moist climate and soil seem to be the most essential conditions for its growth, as it reappears upon the higher parts of the Cascade range, and does not extend up Puget Sound, (where the soil and climate are dry,) though common at the Straits of Fuca. It is remarkable for growing on brackish marshes, sometimes overflowed, and on inundated islands of the Columbia.

This tree has sometimes a diameter of eight feet, but is less lofty than the red fir, which is distinguished west of the Coast range by overtopping this the prevailing species. Its bark is dark reddish and scaly, not unlike that of the wild cherry of the Atlantic States, (*C. SEROTINA*.) Its branches commonly commence about thirty feet from the ground, and grow more densely than in any other species, while its leaves, growing in several rows entirely around the twigs, form a thick, dark green foliage, with bluish reflections when their glaucous under surface is turned upward by the wind. The cones grow near the ends of the branches, and are about two inches long, of a fine bright purple color when young. Its wood is very tough, and when not too knotty makes good masts and planks for vessels, but is poor fuel, excepting the young branches, which are very resinous. The long, tough, fibrous roots are used by the Indians to make very strong baskets and bags. It resembles the "Norway spruce" of our gardens, in general habit, more than any other.

The tree probably most generally diffused, though nowhere forming forests alone, is the "Oregon cedar," (*THUYA GIGANTEA*), more nearly allied to the arbor-vitæ than to the juniper, commonly called cedar eastward. This, like the other trees, grows to an immense size, being often from twelve to fifteen feet in diameter, but is not equal to the spruces in height. Its trunk is often straight and branchless for twenty feet, but the top is so knotty as to be of scarcely any value. In lightness, softness, and durability, its wood excels any other, but is deficient in strength and elasticity. It is used chiefly for shingles, rails, and fine inside finishing. For most purposes for which the redwood of California is used it is superior, and is therefore much exported from the Territory.

A backwoodsman, with his axe alone, can, in a few days, make out of one of these cedars a comfortable cabin, splitting it into timbers and boards with the greatest ease. This the Indians did long before an iron axe was known among them, using stone hatchets, and wedges of the crabapple. They also make from its trunk those celebrated canoes, which have an elegance and lightness superior to any other except the fragile shells of birch-bark used further north. The following facts will show the wonderful durability of the wood of this cedar, which excels that of its eastern relatives, as seen in the peat-bogs of New Jersey, (*Cupressus Thuyoides*, the "white cedar:")

In the damp, dark forests close to the coast I have seen its trunks lying prostrate with several spruces, from three to four feet in diameter, growing upon them, having evidently taken root in the decaying bark, and extended their roots into the ground adjoining, while the interior of the log I found still sound, though partially bored by insects. Judging of the age of the spruces by ordinary rules, this log must have thus lain hundreds of years exposed to the full action of one of the most moist of climates.

On some of the tide-meadows about Shoalwater bay dead trees of this species only are standing, sometimes in groves, whose age must be immense, though impossible to tell accurately.

They evidently lived and grew when the surface was above high-water level, groves of this and other species still flourishing down to the very edge of inundation. But a gradual, slow sinking of the land (which seems in places to be still progressing, and is perhaps caused by the undermining of quicksands) has caused the overflow of the tides, and thus killed the forests, of which the only remains now left are these cedars. This wood is perfectly sound, and so well seasoned as to be the very best of its kind.

Continued and careful examination of such trees may afford important information as to the changes of level in these shores. That these have been numerous and great is further shown by alternating beds of marine shells and of logs and stumps, often in their natural position, which form the cliffs about the bay to a height of 200 feet. But while these remains show that the changes took place in the latest periods of the miocene tertiary epoch, there is no evidence in the gigantic forests living on these cliffs that any *sudden* or *violent* change has occurred since they began to grow—a period estimable rather by thousands than by hundreds of years.

This cedar is most abundant near the coast, but common also in damp forests nearly to the top of the Cascade range, and is known to extend northward to the western slope of the Rocky mountains, growing at a high elevation along their summits into Utah. It is recognizable by its foliage and cones, both resembling those of the arbor-vitae of Canada, but larger. Its bark, too, is thin, coming off in long riband-like strings, of which the Indians make bags and articles of dress. It has been suggested as a good material for the manufacture of paper.

The hemlock spruce (*ABIES CANADENSIS*?) is generally considered the same species as that found in the Atlantic States, but which does not extend north or west of Lake Winnipeg. It differs on the western coast only in superior size, which is often from six to eight feet in diameter and over a hundred and fifty feet in height; while three feet diameter and eighty feet high seem to be the maximum size of those near the Atlantic. It is found scattered through the forests from the subalpine regions down to the coast, mostly in the dampest portions, but nowhere forming forests by itself.

The "Oregon yew," (*TAXUS BREVIFOLIA*,) also much larger than that of Canada, though

perhaps of the same species, and much more like the European yew than that is, grows commonly in damp soil, about the edges of meadows, springs, &c. It is a tree thirty feet high and a foot in diameter, though commonly smaller, the largest being about Puget Sound. Its wood has all the toughness and elasticity of the European yew, and, like it, was formerly used for bows by the natives. Its larger and brighter leaves, smooth red bark, and coral-red sweet berries, easily distinguish it from the hemlock, which it much resembles in growth and foliage. I have seen it at a height of about a thousand feet on the Cascade mountains.

But one other coniferous tree is common in the western region—a pine (*P. CONTORTA*) so much resembling the “Jersey scrub pine” (*P. INOPS*) as to be commonly considered identical. It grows in dry, sandy prairies, forming groves along the sea beach and also high up the mountains. It grows forty feet high and two in diameter, but is of little value as timber. The range of the Jersey pine is widely separated from it, and none occur in the interval from Kentucky to the Rocky mountains.

Besides these seven species, which compose the bulk of the forests, there are a few other coniferous trees which I shall briefly mention, as they occur only in scattered localities, and are therefore of little value.

A tree called “white spruce,” but very distinct from that so named in Canada, found in small numbers about the sound, becoming scarcer towards the Columbia river. It has smooth white bark, when old becoming dark; very long, shining, dark green leaves, arranged mostly in a single series; and as it branches at regular intervals and in symmetrical whorls, forms one of the most beautiful trees of this family. I never could obtain cones, as they fall to pieces after ripening, but from the characters of its leaves have little doubt of its being *ABIES TAXIFOLIA*, *Lambert*. It is certainly entirely distinct from the Douglass or red fir.

A few stunted trees of the yellow or heavy pine, (*P. PONDEROSA*), already described, are found on the dry, gravelly plain near Steilacoom, but are so stunted as to be scarcely recognizable as the same tree so majestic on the eastern slope of the Cascade range.

A “white pine” is said to grow abundantly on the Olympia range and along the west side of Hood’s Canal, where, I believe, it is sawed into lumber. I could never ascertain whether it was the species found on the Cascade mountains (*P. MONTICOLA*) or some other.

The Nootka cypress (*CUPRESSUS NUTKATENSIS*) is doubtless found in the Territory, as it grows both northward and far south on the Cascade mountains of southern Oregon, where it was found by my friend Dr. Newberry. From the general similarity of its foliage to that of a juniper, it seems probable that the tree seen by Mr. Gibbs, “in swamps at the mouth of the Snohomish river,” was the former, which is much more likely to grow in such a situation than a true juniper.

A second species of arbor-vitae (*THUYA PLICATA*) is said by Nuttall to be found on the islands north of the Straits of Fuca, and probably extends within the Territory. “Cedars” on Whidby’s and other islands resemble it in their smaller size and denser branching, but I attributed the variety to soil and did not preserve specimens.

BROAD-LEAVED TREES.

Forests almost exclusively composed of the evergreen coniferae produce, of course, but few trees of other classes; but those found in the Territory are well worthy of special notice, on account of their valuable properties.

The “*foliaceous*” trees there grow almost exclusively on the borders of prairies, river banks,

and such open situations; never in the thick forests of evergreens, though sometimes in scattered localities when not much shaded. They are thus, like the spruces, much limited by natural boundaries to particular districts.

The same oak (*QUERCUS GARRYANA*) which I have mentioned as found in small numbers east of the Cascade range, is more abundant in the valley between it and the Coast range, west of which I do not think there is a single oak tree. On the Columbia, Oak Point is its lowest locality, and a corresponding point on the Chehalis is near the mouth of Black river, where a few stunted oaks occur, covered with long moss, and evidently suffering from the excess of moisture in the vicinity of the coast. At the same place, and from the same cause, the "black spruce" begins to grow, and the "yellow fir" disappears.

The wood of this oak, though inferior to some kinds of the Atlantic States, is useful for many purposes to which oak wood is applied. It rarely grows more than fifty feet high and two in diameter, branching low like an apple tree, so that at a distance groves of it look much like orchards, giving to the prairies where it grows a rural and home-like aspect. It is rare on the prairies near the Straits of Fuca, but is said to extend further north. It is, however, one of the more southern group of plants which I have mentioned as belonging to the *prairies*, and is crowded out by the extension of the spruces over them. In the partial shade of these it sometimes grows slender and tall, like the oak of our eastern forests.

The "white maple," (*ACER MACROPHYLLUM*), quite different from any eastern species, is the most beautiful of its family in North America. It is frequently eighty feet in height, and attains a diameter of six feet, with smooth white bark and pale green leaves from six to twelve inches in breadth. Its long racemes of yellow flowers appear with the young leaves in May, giving the tree an elegant appearance. Its wood is superior in beauty of veining to either the "curled" or "birdseye" varieties, and is capable of a high polish. Sugar has been made from its sap at the Cascades, and may yet become an important product. This maple grows from a high elevation on the mountains to the ocean; but I did not see it east of the Cascade range, where it seems to be replaced by the third species of the Catalogue, (*A. GLABRUM*), a species of the Rocky mountain forests.

The "vine maple," (*A. CIRCINATUM*), so called from its prostrate and tangled growth, forms almost impenetrable thickets in damp parts of the forests. It grows only twenty or thirty feet high, with a diameter of a foot at most, and is used chiefly for fuel, and boat timbers, for which its crooked stems are well adapted. Its rich purple flowers are very ornamental in April, and its leaves are the only kind that turn scarlet in autumn, like those of so many eastern trees.

The "Oregon alder" (*ALNUS OREGONA*) inhabits a similar extent of country, but is most abundant near the sea, where its light green foliage and white bark contrast agreeably with the dark hue of the spruce forests. It grows sixty feet high, has very soft white wood, excellent for carved wood, furniture, &c. In the dry soil of the valley it is rather scarce, but is said to reappear on the western slopes of the Rocky mountains.

Another smaller alder, (*A. VIRIDIS*), little more than a shrub, grows in small numbers near Steilacoom, and is, perhaps, that mentioned by Nuttall ("*A. rubra*") as occurring near Oak Point.

The "Oregon ash" (*FRAXINUS OREGONA*) grows in moist, sandy soil, on river banks, in the

valley between the Cascade and Coast ranges, but, like the yellow fir, stops at brackish water; and although a few are found down to the mouth of the Columbia, none grow along other rivers west of the Coast Range. It is a larger tree than the eastern white ash, and has all the elasticity and lightness for which that tree is so well known.

The "Oregon dogwood" (*CORNUS NUTTALLII*) is still more strictly limited to the above valley, and seems to disappear north of Steilacoom. It much resembles that of the Atlantic States, but is of much larger size, in all its parts, and quite equal in toughness and strength. Its white flowers, sometimes six inches in breadth, ornament the forests in April.

With a similar range, but extending quite to the Straits of Fuca, is the beautiful arbutus, (*A. MENZIESII*), often called laurel. Its smooth cinnamon-colored bark and shining evergreen leaves have almost a tropical appearance among the northern spruces, and it is, indeed, like the oak, one of the few southern trees which extend from southern California northward in the prairies. It grows almost luxuriantly on gravelly points and banks at the sound, but never west of the Coast range. It attains forty feet in height and two in diameter, and its wood is very strong and heavy, so that crooked pieces are used to make anchors by binding them around stones.

Two, and perhaps more, species of poplar form the forest growth on the inundated river banks from an elevation of 5,000 feet down to tide-water. They are also found on all the rivers running from the Rocky mountains, and perhaps entirely across the continent. The latter is the "cotton-wood," (*POPULUS MONILIFERA*.) The other, distinguished as "balsam" or "bitter" poplar, is peculiar to the western half of the continent, (*P. ANGUSTIFOLIA*.) The wood of both is of little value, but they grow rapidly and are ornamental. The islands and low shores of the Columbia are covered with these trees, of larger size than I have ever seen them elsewhere.

Another poplar, (*P. TREMULOIDES*), the "American aspen," common across the continent, grows on the high mountains and in small numbers about the lakes near Steilacoom, but not west of the Coast range. It is more abundant northward and east of the Cascades. Its wood is of little value, and rarely grows more than a foot in diameter, with a height of forty feet.

Many species of willow grow along the rivers, but only two or three attain the size of trees.

One, (*SALIX SPECIOSA*), with very large and long leaves, seems mostly limited to the streams east of the Coast range. East of the Dalles this and a small hackberry (*CELTIS RETICULATA*) are the only trees seen for hundreds of miles along the Columbia.

The second (*S. SCOULERIANA*) is most abundant west of the Coast range, and grows thirty feet high and one in diameter, but is of little value. Its leaves are large and oval, and its flowers among the first to appear, opening as early as February 20.

The willows along river banks, by their thickly matted roots and stems, support the sandy soil, and accumulate it until it becomes high enough for other trees to grow on it.

The wild cherry (*CERASUS MOLLIS*) attains a height of thirty feet, and in appearance closely resembles the cultivated kinds, which may be advantageously grafted on it. Its wood is of little value, and its fruit small and bitter.

The "Oregon crabapple" (*PYRUS RIVULARIS*) grows sometimes twenty feet high and one in diameter, but usually forms low, tangled thickets, equal to the tropical mangroves in impenetrability. Its wood is hard and tough, used for wedges, &c., and its fruit, though small, is abundant and well flavored, ripening in October. At Astoria excellent apples have been produced by grafts on this tree.

The "Oregon buckthorn," (*FRANGULA PURSHIANA*), one of three distinct plants called "bear-berry" in this Territory, grows on mountain sides and open ravines to the height of thirty feet, but is less than a foot in diameter, and I believe of no especial value as timber. The berries have violent cathartic properties, and, though eaten greedily by bears, are not used by the Indians as food.

A birch (*B. OCCIDENTALIS*?) is said to be common north of the straits, but I did not meet with it. A low, shrubby species east of the Cascade mountains exudes from its branches a bitter resinous substance, (*B. GLANDULOSA*.)

SHRUBBY UNDERGROWTH.

To complete the description of the forests, I must notice briefly the numerous shrubs which constitute an almost impassable underbrush in most parts of them, and are nearly all of use either for their wood or fruits. In their distribution they are even more local than the trees, and different groups characterize very fully the districts into which the forests are divisible. East of the mountains I have remarked that a peculiar group takes the place of forests on the Great Plains. There is also another group belonging to the Rocky mountain forests which grow along the higher river banks, but, not being in a good condition during my visit there, do not appear in the list of plants collected, though I identified the following species among them: *RHUS DIVERSILOBA*, Torr. & Gray; *CRATÆGUS SAGUINEA*, Pall., and another species, *CERASUS VIRGINIANA*?; *ROSA CINNAMOMEA*, Linn.; *RIBES AUREUM*, (a fine yellow currant;) *R. CEREUM*; *CLEMATIS LIGUSTICÆFOLIA*, Nuttall.

The hazel, (*CORYLAS AMERICANA*), red cornel, or "willow," (*CORNUS DRUMMONDII*), and barberry, are also found on both sides of this range. This latter shrub, absurdly called "Oregon grape," (*BERBERIS AQUIFOLIUM*, the "holly leaved barberry,") extends west to the Coast range only. It produces a blue berry, eatable when cooked, and is much cultivated in the Atlantic States as an ornamental plant. This, with a spisea, (*S. ARLÆFOLIA*), a ceanothus, (*C. OREGONUS*), and the hazel, form most of the underbrush of the "fir" forests between the Cascade and Coast ranges. A "mock orange" is also common from the Columbia to Puget Sound, (*PHILADELPHUS*.) Three species of raspberry are also found, mostly in this region, (*RUBUS NUTKANUS*, *LEUCODERMIS*, and *MACROPETALUS*), but to some extent also west of the Coast range. Three species of gooseberry have similar limits, though they do not grow in the shade of forests, (*RIBES DIVARICATUM*, *NIVEUM*?, and *SANGUINEUM*), and a peculiar rose is found only on the borders of the fir forest, (*ROSA GYMNOCARPA*.) On Whidby's island are found two shrubs of much interest on account of their locality, *SHEPHERDIA CANADENSIS* and a *RHODODENDRON*, closely resembling *R. MAXIMUM*, but perhaps distinct, which extends along the Cascade range into southern Oregon.—(*Dr. Newberry*.)

Near Steilacoom, and in other scattered localities, some of the shrubs belonging to the Rocky mountain group are occasionally found, (*RHUS*, *CEANOTHUS VELUTINUS*, *OROPHEILA MYRTIFOLIA*.) On the dry prairie two shrubs are met with—the service berry (*AMELANCHIER CANADENSIS*, var. ? *ALNIFOLIA*) of the northern group, and an elder (*SAMBUCUS GLAUCA*) which belongs to the plains. In the adjoining forests, and often very near it, grows its northern representative, (*S. PUBENS*, var. ?) meeting it here just as it does the allied elder of the Atlantic States near New York. Of the shrubs more characteristic of the black spruce forests, but which occur also on the higher and moister parts of the Cascade range, many are evergreen, giving these gloomy forests an undergrowth of almost tropical appearance, though belonging to alpine or

boreal families of plants. They do not generally obstruct these forests so much as the preceding group, and, except close to the ocean, they can be easily penetrated along the uplands. Probably the most abundant shrub is the "sallal," (*GAULTHERIA SHALON*), important to the Indians from bearing a fine berry which forms much of their winter stock of provisions.

This fruit has, when fully ripe, much the same flavor as a summer apple. The sallal is not uncommon in the fir forests, where, however, it grows only one or two feet high, while near the coast it attains the height of eight feet. Its large, dark evergreen leaves and rose-colored flowers are very ornamental, and in general appearance somewhat resemble the eastern large laurel, (*KALMIA*), which it here takes the place of.

Three species of huckleberry have the same range. The first (*VACCINIUM OVATUM*) is evergreen, with leaves much like a myrtle, and flowers from January to May, producing a black, sweet berry, which remains on it all winter.

The second, (*V. OVALIFOLIUM*), with small deciduous leaves, bears a red acid fruit, tasting much like a cherry. The third (*V. PARVIFOLIUM*) bears a blue acid berry less agreeable in flavor.

Three kinds of gooseberry grow with these, but their fruit is not eatable, (*RIBES LAXIFLORUM*, *BRACTEOSUM*, and *LACUSTRE*.)

Another shrub, allied to the huckleberries, produces a dry capsule, instead of a berry, (*MENZIESIA FERRUGINEA*.)

The most remarkable shrub of this region is the *ECHINOPANAX HORRIDUM*, allied to the Azalea of the eastern States, and, like it, called "Devil's Walking Stick." Its elastic thorny stems, six feet high, and crowned at the top only by a number of very large leaves, shaped like those of a maple, are very unpleasant to encounter in the woods, as they are generally *felt* before they are *seen* in the damp thickets where they grow.

A beautiful evergreen species of wax myrtle (*MYRICA CALIFORNICA*?) occurs rarely about salt marshes at the coast and straits, which seems near its most northern limit, as I never could find on it either flowers or fruit.

I have already mentioned a group of plants which characterize the sphagnous swamps and cold springs at the coast as well as on the mountain tops, and in the most northern parts of the world, among which some are shrubby, (*VACCINIUM MACROCARPON*, *LEDUM PALUSTRE*, *KALMIA ANGUSTIFOLIA*.)

There is a remarkable scarcity of climbing shrubs in these forests—one only, a honeysuckle, (*LONICERA OCCIDENTALIS*), occurring rarely in the fir forests, though several herbaceous climbers assist in obstructing them, (*MEGARHIZA OREGONA*; *VICIA GIGANTEA*, *LATHYRUS POLYPHYLLUS*, and others.)

The last group of shrubs to be mentioned is that growing on inundated river banks, often in the shade of poplars, and forming generally dense thickets. None of these are evergreen, and in winter these poplar woods become quite bare, while the adjoining forests are green above and below.

I have referred to the many shrubby willows which form the first growth at the edge of the water, and are often partly submerged during most of the year. Next to these is found the red cornel, already mentioned, closely resembling one belonging to the northeastern States. Another species (*C. PUBESCENS*) is less common in similar situations, and has a green stem. On ground a little higher, but below the summer inundation, grow two species of snowberry, (*SYMPHORICARPUS*.) Still higher grow the excellent salmonberry, (*RUBUS SPECTABILIS*), a kind of raspberry, with purple flowers and a yellow or seed fruit of delicious flavor. The crabapple,

hawthorn, wild rose, (*ROSA FRAXINIFOLIA*,) and fly blossom, or "bearberry," (*LONICERA INVOLUCRATA*,) form thickets with these. All of these also occur in damp, open places and wet prairies, where sometimes a spiraea (*S. DOUGLASSII*) entirely covers the surface, and closely resembles the eastern "hardhack."

One shrub, allied to the cherry, but, unlike any eastern kind, (*NUTTALLIA CERASIFORMIS*,) grows in damp places, and most abundantly under spruce trees on the brackish marshes.

To call these varied and magnificent forests by the general name of "pine," as is often carelessly done by travellers, neither conveys a correct idea of them to strangers nor does justice to their importance. "Spruce" would be better, but is the term applied in the Territory to the forest of black spruce west of the Coast range, while "fir" is the general term for those between this and the Cascades. Pines are truly characteristic of the forest on the eastern side of this range.

I need not here particularize the animals of these forests, since nearly all the quadrupeds collected west of the range belong to the forest exclusively. Of these, the most peculiar to them are the red lynx, (*L. FASCIATUS*,) bushy-tailed rat, (*NEOTOMA OCCIDENTALIS*,) and several little shrews and mice; while the panther, black bear, raccoon, skunk, fisher, marten, mink, weasel, Oregon tree squirrel, ground squirrel, and flying squirrel, nearly resemble eastern species; and being all climbing arboreal animals, except the skunk, are almost entirely limited to the forest.

The elk and deer may be considered inhabitants of the prairies, as they obtain most of their food there; and the little rabbit of the Territory is never found in the dense forests. Few birds inhabit their gloomy recesses, and especially in summer their silence is rarely broken, except by the harsh voice of the jay, the screaming of the hawk, or the barking of the squirrel, which, though not loud, is audible for miles. Occasionally the blue grouse or the pheasant startle the traveller with their loud whirring flight, or an owl silently glides past him, astonished at so unusual a visitor; but it is rare for the traveller to see any of the larger animals, unless provided with good dogs. The Indians, from fear of the panthers and of "skookums" as spirits, fear to go through the dense woods, except in large parties, and they are, therefore, generally a pathless and solitary wilderness. Such we found them when ascending the western slopes of the Cascade range, and the same character prevails throughout the still denser forests of the Coast range. The occurrence of many animals was a sure indication of an approach to prairies or openings.

CLIMATE OF THE WESTERN REGION.

I have already alluded to the influence of climate on the distribution of trees east of the Cascade mountains, and also to the same cause as affecting the growth of species on the opposite sides of the Coast range. As a means of comparison, I here quote the records kept at Vancouver, by which it appears that in 1852 the total fall of rain amounted to 52.45 inches; in 1853, 42.04 inches; the mean of which is 46.49 inches; while at the Dalles it was but 14.70 inches. It also appears that rain fell during every month of 1853, and that more fell at Puget Sound than at Vancouver.

West of the Coast range it is well known that more rain falls than east of it. The "Hyetographs" accompanying the Surgeon General's Meteorological Register illustrate the difference in a very striking manner. These show the difference at Astoria to be 5 inches more in spring, 10 in autumn, and 10 in winter, giving about 60 inches for the year; while at Vancouver it is

50. In summer there is little or no difference recorded. In addition to this, the nature of the soil causes the retention of much more moisture near the coast, there being often a very tenacious clay at or near the surface. Near the mouth of the Columbia there is also much more rain than at a distance of a few miles north or south of it. I have stated that towards the summit of the Cascade range there is also a much greater precipitation of moisture, which is accompanied by the reappearance or greater luxuriance of the trees and other plants of the coast forests, and this is especially well marked in the gap of the Cascades.

I have already mentioned the difference observed in the temperature both of summer and winter at the Dalles and at Vancouver, which are in nearly the same latitude. By the same records it appears that the mean annual difference between Vancouver and Steilacoom, a hundred miles further north, is exactly 2 degrees, each season being a little cooler at the latter place. The same or a greater difference exists along the coast, but has not been recorded. The effect, however, of these differences on vegetation is scarcely appreciable, and the amount of moisture is by far the most influential. Of cultivated crops no statistics are at hand, but I have observed that in the wet summer of 1854 they did best east of the Coast range; while that of 1855 being much drier, they succeeded best west of it.

I have alluded to the mildness of the winters, and, in addition to the published records, some notes on its effects in relation to natural history may be interesting.

At Vancouver, from November 18 to January 4, 1853, the weather was very mild and rainy, though with many bright, warm days. There was often slight frost at night, but vegetation continued, and flowers of several kinds were constantly to be found on the prairie. I thought December pleasanter than the month I had spent there after my arrival in the middle of June, as it was cooler and not much more rainy.

On January 5 there was a fall of two inches of snow, and the rest of the month was clear and cool for days together, an easterly wind taking the place of the usual winter sea breeze. More snow fell on the 13th, 16th, 20th, and 24th, making in all about 6 inches, which covered the ground for two weeks. By the 26th the Columbia was closed with ice nine inches thick, which broke up on February 10. The thermometer did not fall to zero during the winter, and the lowest I noted was 15°.

On February 20 I went to the mouth of the Columbia, and remained there and at Shoalwater bay the spring following. On the 25th the native willow and chickweed (*STELLARIA BOREALIS*) were in flower and winter at an end, although there was a light fall of snow afterwards, and spring came slowly. This winter was one of the coldest ever known at Vancouver, where it is rare for the river to freeze at all. Its effect on the migration of birds was marked, as it drove southwards the immense flocks of swans, geese, and ducks, which usually make the Columbia their winter resort. A few birds, too, seemed to have crossed from the colder eastern side of the Cascades, (*PICICORVUS*,) but the greater part of the land birds, as usual, remained constantly at their summer homes, including more than twenty species.

The next winter I spent at Shoalwater bay, and made the following notes regarding it: There was white frost first on the 7th of October, and afterwards much clear frosty weather up to the last week in December, with northeast wind, unusual at this season. The last week of the year was marked by a continued and severe storm, not cold, but with heavy rains from the southwest. On December 21 I saw the large, brown salamander still crawling actively about, and the same week noticed a warbler and snipe.

1855.—The new year began clear and cold, like the last. January 2d it snowed a little, but this was washed away by a rain following after it. It again snowed on the night of the 5th, and cleared off so cold that ice formed along the shore of the bay. On the 9th the warm southwest winds again prevailed, and there was scarcely any cold weather afterwards.

January 14.—It was so warm that a bat came out and flew about the house for some hours before dark. "January 7. The weather has been, lately, growing daily warmer, with a SE. wind. Observed to-day many frogs and striped snakes, and the large slugs and salamanders are crawling about. In the evening frogs are piping their serenade, the pleasant harbinger of early spring. The myrtle-leaved huckleberry is beginning to blossom, and the buds of trees are bursting; everything seems as advanced as in April at home."

This clear, warm weather continued until February 1, when it rained again, almost constantly for two weeks. Then came another mild, clear term, followed by cold weather, ice forming $\frac{1}{4}$ inch thick.

February 20.—"*Nardosmia palmata*, *Rubus spectabilis*, and *Trillium grandiflorum* are in flower." On the 23d I went up the Chehalis river, and to Puget Sound, which I soon after descended as far as the Straits of Fuca. There, as early as March 17, I found that the delicate little humming bird, swallows, and warblers had already reached the extreme northwest corner of the Territory, and I was disappointed in my hopes of obtaining some rare winter visitors from the north. The flowering currant, strawberries, and many other flowers were there blooming, and the winter was, of course, ended. During this winter more than twenty land and sixteen aquatic species of birds were almost constantly about the bay, some leaving only for a few days during the coldest part of January. A comparison of these numbers and species of birds with those remaining through winter in the same latitudes on the eastern coast will show very strikingly the difference in climate on the opposite sides of the continent.

FRESH WATERS OF THE TERRITORY.

Some general remarks upon the waters of the Territory, and their peculiar relations to their animal and vegetable productions, are necessary to complete these notes on the natural regions.

Taking the fresh waters first, they being, with few exceptions, branches of the Columbia, and those which are not so being small and few, I shall treat of them as if they were, knowing but few differences in their natural products. Closer examinations will, doubtless, disclose the fact that these different waters have many animals, especially small fish, peculiar to each of them, but those which are amphibious can migrate from one to another, and plants are generally extended throughout them by means of their seeds, which are transported by birds, winds, &c. I have already alluded to the fact that an extensive group of plants inhabiting marshes were of identical species with those found in similar places throughout the northern part of this continent, and even of Europe and Asia. A smaller series, more truly aquatic, presents the same fact in a remarkable manner, (*Scirpus lacustris*, *Typha latifolia*, *Polygonum amphibium*, and others.)

The low temperature of the rivers, and of the springs which form most of the marshes, accounts in great measure for this similarity in vegetation at the level of the sea, and at a height of 5,000 feet on the mountains. The original source of all these waters (except those arising in the Coast range south of the Chehalis) is in the perpetual snows of the mountains, and in their rapid course to the sea they become heated only in those few places where expanded into small lakes and sloughs. The very perfect drainage of the country prevents

the formation of extensive swamps, and no doubt accounts for the remarkable healthiness of a country exposed to such great moisture from rains. An inspection of the map will show that, especially west of the Cascade range, the rivers, though small, are exceedingly numerous. Many, too, of quite large dimensions during the rainy season, become nearly or quite dry in summer, particularly east of the Cascades. Their water is almost always exceedingly clear, though some are turbid during the summer floods, especially the Columbia and Cowlitz, which has then a bluish, milky hue.

I have seen very few that presented the dark hue arising from decomposed vegetation. One of these is the Okanagan, east of the Cascades, which, unlike all the others on that side, is dark, slow, and broad, having many lakes in its course caused by its expansion. The temperature of this river on September 27 is stated by Lieutenant Mowry as "much higher" than that of the Columbia near its mouth, which was 52° . To this fact I attribute the occurrence in it of several interesting species of mollusca, of which I had hitherto found but three species in the rivers.

Again, on the west side of the range is the *Black river*, much smaller, though apparently deeper, and perhaps conveying as much water. Around this is the most extensive swamp I have seen in the Territory, partially covered with forest, and doubtless producing many plants not to be found elsewhere. I had no opportunity of collecting anything there.

It is observable that both of these, as well as the Willamette and that part of the Columbia from the Cascade to the Coast ranges, flow nearly *parallel* instead of transverse to the mountains, and, having slow currents, are consequently deeper, warmer, and more expanded than the other streams. In June, 1853, I found the Willamette warm enough to bathe in at Portland, while the Columbia at Vancouver, then high from the summer floods, was entirely too cold. The published record of its temperature during the freshet of 1854 shows that at the commencement, on May 8, the temperature of the river at Vancouver was only 40° . It can scarcely be supposed to have been warmer previously, as the rains had not ended nor the weather become hot. From 40° it rose and fell alternately until July 20, when the record terminates, the highest temperature being, on June 30, 55° . It is somewhat singular that the *rise* in temperature corresponded with the *rise* of the water, and *vice versa* during June, which may have been due to warm rains. But as the water fell, during July, the warmth gradually increased from 47° to $53^{\circ}.5$, the points given for the first and twentieth of the month. It, doubtless, continued to increase afterwards during the lowest stage of the river, which is between July and December.

It is, however, hardly probable that the warmest portions of the Columbia attain a warmth much above 60° , which is allowing an increase of 8 during its course from the mouth of the Okanagan to Vancouver, while it is continually receiving branches from the mountain snows. The temperature of 52° , observed at the former point on September 27, is, doubtless, about the highest it reaches there, since that period was at the very middle of the dry season, and the snow-flood had long since ceased.

In connexion with this low temperature, and with the fact that in most winters the streams west of the mountains rarely freeze, thus limiting the temperature of the year between about 35° and 60° , we find that, though abounding in fish of many species, all those constantly *inhabiting* it belong to but two families, SALMONIDÆ and CYPRINIDÆ, excluding those which merely enter the river in summer to spawn, as the sturgeon, lamprey, &c. Reptiles and

mollusca are also rare, being confined almost exclusively to the lakes, marshes, and sloughs near the river, which become warmer in summer.

The Columbia continues fresh so near its mouth that I have found the water drinkable even at high tide, and in August, just within Cape Disappointment, less than a mile from the breakers outside the bar.

To this fact is attributable the scarcity of such animals as usually inhabit estuaries. Though I visited the place at all seasons I never found on the shores of Baker's bay but two species of mollusca, while in the bay, only a mile or two north of it, are more than twenty. But several species are known to inhabit the deep water about the bar of the Columbia, where they were dredged up by the Exploring Expedition. It is probable that the water is much saltier at that depth than near the surface.

Aquatic mammalia, such as the beaver, muskrat, otter, and seal, abound in the fresh waters; and one seems to be peculiar to the Territory, the water shrew, (*NEOSOREX NAVIGATOR*), caught while swimming a foot below the surface of one of the lakes at the head of the Yakima river, and at least 2,500 feet above the ocean.

SALT WATERS OF THE TERRITORY.

The salt waters of the Territory constitute a botanical and zoological region, equal in importance to the others described, and, in their great variety of animal life, far surpass the corresponding portions of the Atlantic coast. A short description of the peculiarities in the conformation of the shores will, in some degree, account for this fact. Commencing with the northwest sounds, we find there a large body of water from twenty to sixty fathoms deep, with shores almost everywhere bold and hard, so that the largest ships can literally tie fast to the trees along shore in many portions where they cannot readily anchor on account of the depth. This great body of water is nearly as salt as the ocean itself, and is renewed twice in each day by tides, which range between the limits of eighteen feet, each alternate tide being less than the preceding, until it is reduced to a rise or fall of less than a foot, when it begins to increase again, the other series decreasing in its turn. By this arrangement it happens that the extreme low tides occur about once in every fortnight.

The high mountains, and generally steep cliffs on each side, completely protect the sounds from storms, so that calms are almost constant in their inner labyrinths, and they are thus as admirably fitted for the production of animal life as the most carefully constructed aquarium. In very short visits and hasty voyages on the sounds I had little opportunity for collecting, and obtained, I believe, nothing new. But the great number of animals obtained by others, and most of which exist in abundance, show its richness in zoology, while it may be safely estimated that a third of its inhabitants are yet unknown to science.

A longer residence at Shoalwater bay allows me to speak of it more particularly. It is twenty-five miles long and from three to seven wide, thus including an area of more than a hundred square miles. Of this large surface two-thirds may be said to become bare at ordinary low tide, and probably more than three-quarters at the lowest semi-monthly ebbs, of which those of May and June are even lower than the others, though all less in their extremes than those of the sounds.

The least depth of water on the bar is, by the Coast Survey charts, three and a quarter fathoms, which increases just within it to seventeen fathoms, and varies in the channels from this depth to three fathoms at the mouths of the larger rivers. There are five rivers emptying into the bay, which bring down a large amount of fresh water, and six large creeks, which,

though wide at high water, become almost dry at medium ebb-tides, and were caused by the tides flowing through channels in the meadows originally formed by small brooks. The Willopah is navigable for about fifteen miles; the other rivers from four to twelve. There is, of course, a large mixture of fresh water with the salt in the bay, while, at the same time, the rivers are all more salt at their mouths than the Columbia, and for a proportionately much greater distance up them. The bottom of the bay is composed of sand, hard near its mouth, but becoming more and more mixed with mud towards the mouths of rivers and its south end, where it is too soft to bear a man's weight. There are several hard, sandy or gravelly points about the bay, and isolated rocks in a few places.

Such a variety of "stations" produces a corresponding variety of molluscons and other animals, which are fully spoken of elsewhere with regard to their distribution. I may remark that while all the same varieties of station occur in the sounds, and produce a corresponding series of animals, the greater depth, saltness, and more rocky bottom of those waters, favor the existence of many additional species.

The immense numbers of waterfowl that frequent this bay at almost all seasons is also referred to in my notes on them, and it will be remarked that nearly all of them are of the same species as on the Atlantic coast, though some, like the pelican, reach a much more northern latitude. The variety of fish is apparently greater than in the Columbia, though less than in the sounds. A single large starfish, occasionally washed up from deep water, is the only radiate animal I have seen there.

Gray's harbor has, apparently, much less variety of animal life than Shoalwater bay. Its bottom is more sandy, and the water probably saltier than in the bay; and I have remarked that the tides flow up it for forty-five miles, though it does not taste brackish at that distance up.

The shore of the ocean, from the Columbia to Gray's harbor, which is the only part I have visited, is shallow and sandy, and produces less variety of animals than might be expected from visiting the other waters. Though I have walked the whole distance of forty miles twice, and part of it oftener, and at all seasons, I have obtained little more than I did in the bay. I also made a voyage outside, from the Columbia to Shoalwater bay, in a small schooner, being two days and two nights out, but I observed nothing not before seen.

There are several animals peculiar to the ocean, which are worthy of special reference, being more fully described in my notes on species elsewhere given.

The sea otter, inhabiting the rocky coast further north and south, is the most interesting and important, being a close link between the otters of fresh waters and the seals, of which one or more species abound along the coast, and go far up the rivers. Allied to these are the cetaceans, of which small kinds, called "humpback" and "finback" whales, are constantly to be seen at a distance of a mile or two from the shore, and are sometimes washed up on the beach, supplying a rare feast to the Indians, as well as a supply of oil to the whites. One of these, some years ago, is said to have entered Shoalwater bay, and spouted about there for several days, while the few inhabitants had no weapons to attack it with. Occasionally the large "right whale" is said to be washed ashore along this beach. Porpoises are common in summer, and enter the bays; and the species called by whalers the "killer" has been rarely washed up, one of them in the summer of 1855.

Several birds are peculiar to the ocean. The albatross and several little known auks, of singular forms, are seen out of sight of land, but never enter the bays and rarely ever approach the beach, though said to be abundant on rocky islands along other parts of the coast. At

the lofty rocky promontory of Cape Disappointment I found two or more species rarely seen within the mouth of the Columbia, though frequenting the outside of the cape in immense numbers—(PHALACROCORAX and APHRIZA.)

Of the fish peculiar to the ocean I know little, though the large skate found at the mouth of Shoalwater bay seems to be one of them. Immense numbers of small cod, and of an excellent kind of anchovy, are sometimes washed up near and within the mouth of the Columbia.

A peculiar radiate (SPATANGUS) is found along the beach, and one mollusc, only, that I have not found elsewhere, (CUTELLUS,) called there the razor clam, and considered the best of the bi-valves for the table.

The vegetation of the salt waters is almost as interesting as its animals, although, being of a low organization, it has not yet attracted so much attention.

The immense "kelp" of the Pacific, (MACROCYSTIS,) rivalling the gigantic forest trees of the coast, sometimes said to be 300 feet in length, and growing at both ends of that ocean, is a most remarkable object as it lies extended along the beach like an immense serpent, or, coiled in tangled masses, it floats about, carrying attached to its roots stones of many pounds weight. In the sound this seaweed grows plentifully, as well as in the deep sea, but not on sandy parts of the coast.

Mr. Ashmead has kindly noticed two other interesting species of Algae collected on the coast in my catalogue of plants. The plants of higher orders growing close to or in salt water illustrate the same fact in respect to distribution as those found along rivers, &c., most of them being of very wide distribution both on this continent and in other parts of the world. (*Lathyrus maritimus*, *Potentilla anserina*, *Ligusticum scoticum*, *Plantago maritima*, *Armeria vulgaris*, *Glaux maritima*, *Zostera marina*, *Ruppia maritima*, and several others.)

In regard to the temperature of the salt waters I can only say that it probably varies much less than that of the fresh, since the currents of the oceans coming from the northwest keep it cool in summer, while it never freezes, except where largely mixed with fresh water, and in shallow bays. It is well known, too, that the vast body of the North Pacific is warmer than the Atlantic in the same latitudes, and that icebergs are never seen anywhere near the coast of the Territory.

SCENERY OF THE WESTERN REGIONS.

The natural features of Washington Territory are strikingly different throughout from those of a corresponding portion of the Atlantic coast, owing both to its mountainous character and peculiar products. To a traveller approaching the coast by sea the whole country appears mountainous and densely clothed with dark green forests from the water level to the limits of perpetual snow. Far above this tower in indescribable majesty and beauty the brilliant snow-clad peaks of the Cascade range, in strong relief against the deep blue sky, and seemingly close to the sea, although Mount St. Helens, the nearest, is one hundred miles inland. At sunset the softening mist which often hangs over them becomes tinted with the most delicate hues, gradually changing through the shades of rose, purple, and lilac, until in the moonlight they become like monuments of shining silver.

On nearing land this noble scenery is found to be accompanied by a proportionately gigantic vegetation, and, indeed, everything seems planned on a gigantic scale of twice the dimensions to which we have been accustomed. The Columbia, unequalled in grandeur even by the "Father of Waters," is bordered by lofty cliffs and mountains, clothed from base to summit

with perpetual verdure, and supporting on almost every foot of surface trees of astonishing magnitude. At every bend constantly varying scenes of the wildest beauty burst upon the view, while the calm silence is often unbroken, save by the screaming of the panther or the shrill cry of the eagle soaring far overhead.

The universal and gloomy forest soon becomes monotonous, and it is a relief to see the canoe gliding silently along, the log-cabin of the pioneer on the shores, or to hear the shrill whistle of the steamboat echoing from bank to bank, and starting the savage inhabitants of the woods. Though few signs of inhabitants may be seen, there are usually a few yards back of the line of the poplars that edge the river large and fertile prairies, and farms well stocked with the products of the soil.

On the smaller rivers a striking variety in scenery is observed, as in a few miles we pass from the sandy sea-beach through luxuriant meadows, upland prairies, and forests with all their different vegetation, until reaching the end of navigation we find a mountain torrent, walled in by precipitous sides, and falling in successive cascades for hundreds of feet. All this is seen within ten miles of the ocean, on the "Copalux river," as well as on some running into Puget Sound.

Entering by the Straits of Fuca the scenery is quite different but no less interesting.

The calm blue waters of the sounds lie placid as a lake in the basin formed by their steep shores with an ever varying outline of points and bays, and dotted with islands of every form and size. Prairies are often visible to the water's edge, interspersed with evergreen forests, and extending as an elevated plateau to the base of the rugged and snowy mountains that rise like walls on the east and west.

With all this magnificence there is not wanting scenery of a milder and more home-like aspect. The smooth prairies, dotted with groves of oaks, which in the distance look like orchards, seem so much like old farms that it is hard to resist the illusion that we are in a land cultivated for hundreds of years, and adorned by the highest art, though the luxuriant and brilliant vegetation far excels any natural growth in the east. Nothing seems wanting but the presence of civilized man, though it must be acknowledged that he oftener mars than improves the lovely face of nature.

The sea-beach, too, has peculiar attractions for one accustomed to live in its vicinity. Its broad hard sand forms an excellent road, smooth and solid as the floor, on which are often to be found objects of interest and value, free gifts from the domains of Neptune. The constant roar of the surf forms a pleasant relief to the silence of the surrounding forrests, and in solemn tones unceasingly it speaks of that Power who created all these things, "whose path is in the great waters, and whose footsteps are not known."

No. 2.

CATALOGUE OF PLANTS COLLECTED EAST OF THE ROCKY MOUNTAINS.

BY PROFESSOR ASA GRAY.

PLANTS COLLECTED EAST OF THE ROCKY MOUNTAINS.

This collection was made by Dr. Suckley from the Mississippi river westward to Fort Benton, and Lieutenants Donelson and Mullan along the Missouri river from near St. Louis to Fort Union. All the plants were collected between May 10 and the end of August. This collection all belongs to one and the same region, physically and botanically—that of the plains of the northwestern portion of the great Mississippi basin. The species may, therefore, be enumerated without regard to their particular localities, which, moreover, are not always recorded in the collection. Little novelty was to be expected in a collection made in rapidly traversing a district already so repeatedly and thoroughly investigated. The species are, therefore, enumerated in the form of a classified list, such remarks or descriptive observations as are requisite being appended, as are the characters of some new plants; for this collection is found to contain three undescribed species and one new genus.

CLEMATIS VIRGINIANA, Linn. Vermilion river, Mo.

PULSATILLA PATENS, DC.

ANEMONE PENNSYLVANICA, Linn.

ANEMONE CYLINDRICA, Gray.

THALICTRUM CORNUTI, Linn.

RANUNCULUS DIVARICATUS, Schrank. This is the *Ranunculus aquatilis* in part of Linnaeus and of American authors, and *R. circinatus*, Sixth. It is the only species of the section *Batrachium* which I have seen in this country.

RANUNCULUS ABORTIVUS, Linn.

RANUNCULUS RECURVATUS, Poir.

RANUNCULUS REPENS, Linn.

AQUILEGIA CANADENSIS, Linn.

DELPHINIUM TRICORNE, Michx.

DELPHINIUM AZUREUM, Michx.

ACTÆA RUBRA, Bigelow.

MENISPERMUM CANADENSE, Linn.

PODOPHYLLUM PELTATUM, Linn.

ARGEMONE MEXICANA, Linn. var. ALBIFLORA.

CORYDALIS AUREA, Willd.

NASTURTIIUM SESSILIFLORUM, Nutt.

- NASTURTIUM PALUSTRE, DC.
 NASTURTIUM OBTUSUM, Nutt.
 NASTURTIUM LIMOSUM, Nutt.
 ARABIS HIRSUTA, Scop.
 SISYMBRIUM CANESCENS, Nutt. A nearly glabrous variety.
 ERYSIMUM CHEIRANTHOIDES, Linn.
 ERYSIMUM ASPERUM, DC.
 STANLEYA INTEGRIFOLIA, James. Without much doubt this is a mere state of *S. pinnatifida*.
 STANLEYA PINNATIFIDA, Nutt.
 SINAPIS NIGRA, Linn. (Introduced.)
 CAPSELLA BURSA-PASTORIS, DC.
 LEPIDIUM VIRGINICUM, Linn.
 LEPIDIUM INTERMEDIUM, Gray, Pl. Wright.
 DRABA MICRANTHA, Nutt.
 CLEOME INTEGRIFOLIA, Torr. & Gray.
 VIOLA CUCULLATA, Ait.
 VIOLA PALMATA, Linn.
 VIOLA CANADENSIS, Linn.
 ELODEA VIRGINICA, Nutt.
 MÖHRINGIA LATERIFLORA, Fenzl.
 CERASTIUM ARVENSE, Linn.
 CERASTIUM MUTANS, Raf.
 MALVASTRUM COCCINEUM, Gray. One hundred miles above Fort Pierre.
 LINUM PERENNE, Linn.
 LINUM RIGIDUM, Pursh.
 GERANIUM MACULATUM, Linn.
 OXALIS VIOLACEA, Linn.
 OXALIS CORNICULATA, Linn.
 ZANTHOXYLUM AMERICANUM, Mill.
 RHUS TOXICODENDRON, Linn.
 RHUS AROMATICA, Ait. White river, Nebraska.
 AMPELOPSIS QUINQUEFOLIA, Michx.
 CEANOTHUS OVALIS, Bigel., var.
 STAPHYLEA TRIFOLIA, Linn.
 NEGUNDO ACEROIDES, Moench.
 POLYGALA ALBA, Nutt.
 VICIA AMERICANA, Muhl.
 LATHYRUS LINEARIS, Nutt.
 LATHYRUS POLYMORPHUS, Nutt.
 LATHYRUS VENOSUS, Muhl.
 AMPHICARPA MONOICA, Ell.
 GLYCIRRHIZA LEPIDOTA, Nutt.
 PSORALEA LANCEOLATA, Pursh.
 PSORALEA ARGOPHYLLA, Pursh, and var. DECUMBENS. Less silvery and silky-hirsute; stems slender, decumbent or diffuse; stipules mostly near equalling the short petiole; leaflets ellip-

tical or narrowly oblong, (1-1½ inch long, ⅓-½ inch wide,) some glabrate above, flowers smaller. Little Muddy river, August 10. This is perhaps the *P. campestris*, Nutt., which I have never seen; but the leaves of that species are said to be only one or two lines broad. Fruiting specimens are desirable.

PSORALEA CUSPIDATA, Pursh.

PSORALEA ESCULENTA, Pursh.

AMORPHA FRUTICOSA, Linn.

AMORPHA NANA, Nutt., (*microphylla*, Pursh.)

AMORPHA CANESCENS, Nutt.

PETALOSTEMON VIOLACEUM, Michx.

PETALOSTEMON CANDIDUM, Michx.

TRIFOLIUM STOLONIFERUM, Muhl.

TRIFOLIUM PRATENSE, Linn.

TRIFOLIUM REPENS, Linn.

HOSACKIA PURSHIANA, Benth.

ASTRAGALUS CARYOCARPUS, Ker.

ASTRAGALUS GRACILIS, Nutt.

ASTRAGALUS MISSOURIENSIS, Nutt.

ASTRAGALUS ADSURGENS, Pall., *var. ROBUSTIOR*, Hook. *Astragalus striatus*, Nutt. in Torr. and Gray, Fl. 1, p. 230. Apparently very abundant on the Upper Missouri, the specimens in flower only; fruit not seen. This is evidently only a larger form of Hooker's *A. adsurgens*, which seems to be that of Pallas also. The lower stipules cohere more or less opposite the petiole, but the upper ones are distinct.

ASTRAGALUS CANADENSIS, Linn.? in flower only.

ASTRAGALUS RACEMOSUS, Pursh.

ASTRAGALUS BISULCATUS, Gray. (Plate I.) *Phaca bisulcata*, Hook. Fl. Bor.-Am., 1, p. 145. Specimens with mature fruit, of which I give a figure.

ASTRAGALUS PECTINATUS, Dougl. *Phaca pectinata*, Hook., l. c. 54. The ripe fruit is much blunter and thicker than in Hooker's figure.

ASTRAGALUS FILIFOLIUS, (Plate I.) *Phaca longifolia*, Nutt.; *Psoralea longifolia*, Pursh. The name *longifolius* being preoccupied in *Astragalus*, this may take the more characteristic name of *A. filifolius*.

OXYTROPIS LAMBERTI, Pursh. Various forms, doubtless including more than one of Nuttall's species.

OXYTROPIS SPLENDENS, Dougl. A most elegant plant, with its crowded silvery silky-villous foliage and spikes, and deep blue corollas. It was gathered on the Chippewa river.

DESMODIUM NUDIFLORUM, DC.

LESPEDeza HIRTA, Ell.

LUPINUS PUSILLUS, Pursh.

LUPINUS PERENNIS, Linn.

SOPHORA SERICEA, Nutt.

THERMOPSIS RHOMBIFOLIA, Nutt.

GLEDITSCHIA TRIACANTHOS, Linn.

SCHRANKIA UNCINATA, Willd.

CERASUS VIRGINIANA, DC.

- GEUM VIRGINIANUM, Linn.
 GEUM STRICTUM, Ait.
 GEUM TRIFLOSUM, Pursh.
 SANGUISORBA ANNUA, Nutt.
 CHAMÆRHODOS ERECTA.
 POTENTILLA NORVEGICA, Linn.
 POTENTILLA PARADOXA, Nutt.
 POTENTILLA PENNSYLVANICA, Linn.
 POTENTILLA CANADENSIS, Linn.
 POTENTILLA ANSERINA, Linn.
 POTENTILLA ARGUTA, Pursh.
 FRAGARIA VESCA, Linn.
 RUBUS STRIGOSUS, Michx.
 RUBUS VILLOSUS, Ait.
 ROSA BLANDA, Ait.; Fort Clark, Neb.
 CRATÆGUS COCCINEA; Fort Union, Neb.
 AMMANIA LATIFOLIA, Linn.
 OENOTHERA BIENNIS, Linn.
 OENOTHERA ALBICAULIS, Nutt.
 OENOTHERA CORONOPIFOLIA, Torr. & Gray.
 OENOTHERA CÆSPITOSA, Nutt.
 OENOTHERA SERRULATA, Nutt.
 GAURA COCCINEA, Nutt.
 CIRCEA LUTETIANA, Linn.
 MENZELIA (BARTONIA) ORNATA, Torr. & Gray.
 ECHINOCYSTIS LOBATA, Torr. & Gray.
 RIBES HIRTELLUM, Michx.; fifty miles above Fort Union, Neb.
 RIBES ROTUNDIFOLIUM, Michx.
 RIBES FLORIDUM, L'Her.; near Fort Union, Neb.
 RIBES AUREUM, Pursh.; one hundred miles above Fort Pierre, Neb.
 OPUNTIA MISSOURIENSIS, DC.
 HEUCHERA RICHARDSONII, R. Br.
 SANICULA MARYLANDICA, Linn.
 OSMORRHIZA LONGISTYLIS, DC.
 CYMPTERUS GLOMERATUS, DC.
 MUSENIUM DIVARICATUM, Nutt. (Plate II.) The specimens in this collection, from various localities, all have smooth ovaries and fruit, and therefore belong to the typical form of the species. We give a figure to illustrate the plant. The variety *Hookeri*, Torr. & Gray, *M. Hookeri*, Nutt. ined., and Nuttall's *M. trachyspermum* and *M. angustifolium* appear to be all one species, having shorter as well as scabrous fruit, and probably distinct from *M. divaricatum*; but my present means of comparison do not suffice for determining this point. The number of the vittæ, whether one or more in each interval, rarely affords valid characters; and *Musenium* will probably be merged in *Tauschia*; but this question should perhaps be deferred to a general recension of umbelliferous genera, which is greatly needed. The leaves of *M. divaricatum* are not all opposite, the uppermost being usually alternate.

ARALIA NUDICAULIS, Linn.

CORNUS SERICEA, Linn.; Fort Clark, Neb.

CORNUS STOLONIFERA, Michx.; Fort Clark, "Kinnickinnick."

SYMPHORICARPUS OCCIDENTALIS, R. Br.

SYMPHORICARPUS VULGARIS, Michx.

GALIAM APARINE, Linn.

GALIAM TRIFIDUM, Linn.

GALIAM TRIFLORUM, Michx.

GALIAM BOREALE, Linn.

LIATRIS PUNCTATA, Hook.

EUPATORIUM PERFOLIATUM, Linn.

KUHNTIA EUPATORIODES, Linn.; broad-leaved variety.

ASTER SERICEUS, Vent.

ASTER MULTIFLORUS, Ait.

ERIGERON PUMILUM, Nutt.

ERIGERON CÆSPITOSUM, Nutt.; *var. radiis flavidis*. This is exactly Nuttall's *Erigeron cæspitosum*, or its *var. grandiflorum*, except that the rays are light yellow in the dried specimens; so decidedly so that one can hardly suppose them to have been pure white when living; yet this is possibly the case.

ERIGERON PHILADELPHICUM, Linn.

ERIGERON CANADENSE, Linn.

SOLIDAGO RIGIDA, Linn.

SOLIDAGO INCANA, Torr. & Gray.

SOLIDAGO MISSOURIENSIS, Nutt.

SOLIDAGO GIGANTEA, Ait.

APLOPAPPUS SPINULOSUS, DC.

APLOPAPPUS LANCEOLATUS, Torr. & Gray.

GRINDELIA SQUARROSA, Duval.

CHRYSOOPSIS VILLOSA, Nutt.

SILPHIUM LACINIATUM, Linn.

SILPHIUM PERFOLIATUM, Linn.

EUPHROSINE XANTHIFOLIA, Gray.

IVA AXILLARIS, Pursh.

AMBROSIA CORONOPIFOLIA, Torr. & Gray.

AMBROSIA TRIFIDA, Linn., and *var. INTEGRIFOLIA*.

XANTHIUM ECHINATUM, Murr.

HELIOPSIS LÆVIS, *var. SCABRA*, Torr. & Gray.

ECHINACEA PURPUREA, Moench.

ECHINACEA ANGUSTIFOLIA, DC.

LEPACHYS COLUMNARIS, Torr. & Gray, and varieties.

HELIANTHUS PETIOLARIS, Nutt. A diminutive state of this species, common in the collection is perhaps the *H. pumilus* of Nuttall.

HELIANTHUS RIGIDUS, Desp.

HELIANTHUS MAXIMILIANI, Schröder.

HELIANTHUS STRUMOSUS, Linn.

- GAILLARDIA PULCHELLA, Foug.
 HYMENOPAPPUS TENUIFOLIUS, Pursh.
 ACTINELLA ACAULIS, Nutt.
 ACHILLEA MILLEFOLIUM, Linn.
 ARTEMISIA DRACUNCULOIDES, Pursh.
 ARTEMISIA CANADENSIS, Michx.
 ARTEMISIA CANA, Pursh.
 ARTEMISIA LUDOVICIANA, Nutt.
 ARTEMISIA BIENNIS, Willd.
 ARTEMISIA FRIGIDDA, Willd.
 ANTENNARIA PLANTAGINIFOLIA, Hook.
 SENECEO AUREUS, Linn., and vars.
 SENECEO LOBATUS, Pers.
 CIRSIUM UNDULATUM, Spreng.
 CIRSIUM HOOKERIANUM, Torr. & Gray. var. Leaves mostly pinnately-parted, the segments lanceolate or linear, sparingly spinulose-toothed.—L'Eau qui Court. (Flowers apparently ochroleucous.)
 CIRSIUM DRUMMONDI, Torr. & Gray. Only the heads, with their naked peduncles, were gathered, so that the species is scarcely determinable.
 LYGOESMIA JUNCEA, Don.
 TROXIMON CUSPIDATUM, Nutt.
 TROXIMON GLAUCUM, Nutt.
 MULGEDIUM PULCHELLUM, Nutt.
 LOBELIA SPICATA, Lam.
 SPECULARIA PERFOLIATA, DC.
 CAMPANULA ROTUNDIFOLIA, Linn.
 CAMPANULA LINIFOLIA, Lam.
 PLANTAGO MAJOR, Linn.
 PLANTAGO VIRGINICA, Linn.
 PLANTAGO GNAPHALIOIDES, Nutt.
 LYSIMACHIA CILIATA, Linn.
 APHYLLON FASCICULATUM, Torr. & Gray. The name "*P. glabra*," of Pursh, is a little subsequent in date to Nuttall's *P. erianthera*; but the latter can hardly be said to be characterized in Fraser's catalogue, and the name is badly chosen, the anthe's being very slightly hairy, that Pursh's name may properly enough be preferred. This very handsome species has recently been found by Hooker under the name of *P. Gordonianus*. This genus (ANOPLON, Waller, or ANOPLAVTHUS, Endlicher, but long ago called APHYLLON by Mitchell) will perhaps be merged in PHELYPÆA, Town.
 PENTSTEMON GRANDIFLORUS, Nutt.
 PENTSTEMON GLABER, Pursh.
 PENTSTEMON GRACILIS, Nutt.
 PENTSTEMON ALBIDUS, Nutt.
 VERONICA PEREGRINA, Linn.
 CASTILLEJA SESSILIFLORA, Pursh.
 VERBENA AUBLETIA, Pursh.

LYCOPUS SINUATUS, Ell.

MENTHA CANADENSIS, Linn.

HEDEOMA HISPIDA, Pursh.

MONARDA FISTULOSA, Linn.

BLEPHILIA CILIATA, Raf.

LOPHANTHUS ANISATUS, Benth.

SCUTELLARIA PARVULA, Michx.

STACHYS SYLVATICA, Linn.

TEUCRIUM CANADENSE, Linn.

ONOSMODIUM MOLLE, Michx. In this, as I have observed in the too closely allied genus *Macromeria*, there is, if I mistake not, a dimorphism of the flowers, affecting the form and length of the corolla and filaments.

LITHOSPERMUM CANESCENS, Lehm.

LITHOSPERMUM ANGUSTIFOLIUM, Michx.

PENTALOPHUS LONGIFLORUS, A. DC.

ECHINOSPERMUM PATULUM, Lehm.

ECHINOSPERMUM (LAPPULA) FREMONTII, Torr. (n. sp.): "Stem erect, branching above; leaves oblong-lanceolate, clothed with stiff, incumbent hairs; fructiferous pedicels erect; disk of the nutlets flattish, tuberculate; prickles in a double series, slender, the interior ones longer than the diameter of the nutlets—differs from *E. patulum* in its double row of prickles, and considerable larger fruit: from *E. Lappula* in the much longer prickles and flattish disk, which often has a number of small prickles along the axis. Colonel Frémont collected this plant in his second journey (1844) on Pass creek, near the southern extremity of the Sierra Nevada."—*Torrey*.

CYNOGLOSSUM MORISONI, DC.

ELLISIA NYCTELEA, Linn.

HYDROPHYLLUM VIRGINICUM, Linn.

HYDROPHYLLUM APPENDICULATUM, Michx.

COLLOMIA LINEARIS, Nutt.

PHLOX DIVARICATA, Linn.

PHLOX PILOSA, Linn.

PHLOX ARISTATA, Michx.

PHLOX HOODII, Richards.

CALYSTEGIA SEPIUM, R. Br.

PHYSALIS HIRSUTA, Dunal.

APOCYNUM CANNABINUM, Linn.

APOCYNUM ANDROSAEMIFOLIUM, Linn.

ACERATES VIRIDIFLORA, Ell.

ASCLEPIAS SPECIOSA, Torr. (*A. Douglassii*, Hook.)

ASCLEPIAS NIVEA, Linn.

FRAXINUS VIRIDIS, Michx.

ASARUM CANADENSE, Linn.

OXYBAPHUS NYCTAGINEUS, Sweet.

ATRIPLEX HASTATA, var. (*Chenopodium subspicatum*, Nutt.)

"ENDOLEPIS, N. Gen.

"Flowers monœcious; the male ebracteate, in glomerate terminal spikes; the female solitary and sessile in the axils of the leaves. *Masc.* Calyx gamosepalous, urceolate, five-lobed; the lobes thin, triangular—subulate strongly inflexed, each with a fleshy, protuberant gibbosity at its base outside. Stamens five; filaments subulate, short; anthers oblong, large, scarcely exerted. No rudiment of an ovary. *Fem.* bibracteate; the bracts ovate, membranaceous, inappendiculate, united to the summit, forming a compressed theca which incloses the flower. Calyx of three distinct sepals. No stamens nor staminodia. Ovary ovate; styles two, distinct, filiform, slightly exerted; ovate erect. Utricle ovate, compressed, enclosed in the membranaceous theca. Seed ovate, rostellate at the summit, vertical, embryo nearly annular, very slender; radicle superior. An annual low herb, in aspect resembling *Chenopodium* or *Atriplex*, with lanceolate acute, entire leaves.

"*ENDELOPIS SUCKLEYI*, n. sp. [Plate III.] As a genus this is characterized among *Atriplices* both by the remarkable calyx of the staminate flowers, and by the presence of a manifest three-sepalous calyx in the fertile flowers. The species is dedicated to my former pupil, the discoverer."—TORREY.

OBIONE CANESCENS, Moquin.

OBIONE ARGENTEA, Moquin?

OBIONE SUCKLEYANA, Torr., n. sp. (Plate IV.) "Annual, stem branching, prostrate; leaves suborbicular on long petioles, acutely repand-dentate, pale-green both sides, nearly glabrous; glomerules axillary, monœcious bracts of the sessile fruit deltoid, united to the summit, the margin narrowly winged, crenate-denticulate. Very distinct from every other North American species of *Obione*, but having some resemblance to *O. argentea*. It is remarkable for the roundish leaves, very long petioles, and the large and much compressed nearly glabrous fruit. The male flowers were tetramerous."—TORREY. This was collected in the Milk River valley, August 19.

EUROTIA LANATA, Moq.

ERIOGONUM FLAVUM, Nutt.

POLYGONUM AVICULARE, Linn.

POLYGONUM RAMOSSISSIMUM, Michx.

POLYGONUM VIRGINIANUM, Linn.

POLYGONUM AMPHIBIUM, Linn.

RUMEX VENOSUS, Pursh.

RUMEX CRISPUS, Linn.

RUMEX PERSICARIOIDES, Linn.

RUMEX SALICIFOLIA, Weinm.

SHEPHERDIA ARGENTEA, Nutt. Yellowstone river, Nebraska.

COMANDRA UMBELLATA, Nutt.

EUPHORBIA MARGINATA, Pursh.

EUPHORBIA PLATYPHYLLA, Linn.

URTICA DIOICA, Linn.

PILEA PUMILA, Gray.

MORUS RUBRA, Linn. Vermillion river, Mo.

POPULUS MONILIFERA, Ait.

- SALIX ANGUSTATA, Pursh. Near Fort Union, Nebraska.
 JUNIPERUS VIRGINIANA, Linn.
 ARUM TRIPHYLLUM, Linn.
 ALISMA PLANTAGO, Linn.
 SAGITTARIA VARIABILIS, Engelm.
 CYPRIPIEDUM PUBESCENS, Ait.
 IRIS VERSICOLOR, Linn.
 SISYRINCHIUM ANCEPS, Linn.
 SMILAX HERBACEA, Linn.
 POLYGONATUM GIGANTEUM, Dietrich. *P. canaliculatum*; but the name is a bad one. The species is, I think, distinct from *P. multiflorum* of Europe.
 SMILACINA STELLATA, Desf.
 SMILACINA RACEMOSA, Desf.
 ALLIUM CANADENSE, Linn.
 ALLIUM RETICULATUM, Nutt.
 YUCCA ANGUSTIFOLIA, Nutt.
 LILIUM PHILADELPHICUM, Linn.
 LILIUM CANADENSE, Linn.
 CALOCHORTUS ELEGANS, Pursh.
 UVULARIA GRANDIFLORA, Smith.
 ZYGADENUS GLAUCUS, Nutt.
 JUNCUS TENUIS, Willd.
 TRADESCANTIA VIRGINICA, Linn.
 CAREX ROSEA, Schk.
 CAREX MUHLENBERGII, Schk.
 CAREX STRAMINEA, Schk.
 CAREX CRISTATA, Schw.
 CAREX STRICTA, Lam.
 CAREX FILIFORMIS, Linn.
 CAREX SHORTIANA, Dewey.
 CAREX DAVISII, Schw. & Torr.
 CAREX GRISEA, Wahl.
 CAREX ANCEPS, Willd.
 CAREX ARISTATA, R. Br.
 PHALARIS ARUNDINACEA, Linn.
 CALAMAGROSTIS CANADENSIS, Beauv.
 CALAMAGROSTIS LONGIFOLIA, Hook.
 STIPA SPARTA, Linn.
 STIPA CAPILLATA, Linn.
 VILFA CUSPIDATA, Torr.
 SPARTINA CYNOSUROIDES, Willd.
 BOUTELOUA OLIGOSTACHYA, (*Atheropogon*; Nutt.)
 SESLERIA DACTYLOIDES, Nutt.
 FESTUCA TENELLA, Willd.
 KOELERIA CRISTATA, Linn.

REBOULEA PENNSYLVANICA, Gray.

POA PRATENSIS, Linn.

POA CROCATA, Michx.

TRITICUM REPENS, Linn.

ELYMUS CANADENSIS, Linn.

HORDEUM PUSILLUM, Nutt.

HORDEUM JUBATUM, Ait.

PANICUM CLANDESTINUM, Linn.

PANICUM XANTHOPHYSUM, Gray.

ANDROPOGON SCOPARIUS, Michx.

EQUISETUM HYEMALE, Linn.

CISTOPTERIS FRAGILIS, Bernh.

WOODSIA OBTUSA, Torr.

ASPLENIUM ANGUSTIFOLIUM, Pursh.

ADIANTUM PEDATUM, Linn.

BOTRYCHIUM VIRGINICUM, Swartz.

No. 3.

CATALOGUE OF PLANTS COLLECTED IN WASHINGTON TERRITORY.

BY J. G. COOPER, M. D.

PLANTS COLLECTED IN WASHINGTON TERRITORY.

NOTE.—In order to show the marked dissimilarity in the Floras of the opposite sides of the Cascade range, I have made separate lists of the plants collected by me in the two regions.

Though that from the east side (including a few from the summit of the range) presents a comparatively small number of plants, still it seems to indicate something of the striking distinctions referred to, those from the west having been collected during two seasons, and being a comparatively complete list of the most characteristic plants. Most of the plants common to both regions are inhabitants of the prairies, and it is but just to mention that many of such as inhabit the western prairies have been found by other collectors in those east of the range, though at an earlier season than I visited them. I have made some notes on the distribution of these in the chapter on the trees, &c.

The whole of the first collection was examined and named by Professor Gray. Most of those of the latter collections were also named by him or Professor Torrey, who, as well as Mr. G. Thurber, have kindly assisted me in their determination. I have marked such species with the initials G. and T., where the authority rests on Professors Gray and Torrey.

I am also indebted to Mr. Gibbs for much assistance in collecting, and to Miss E. Lincoln, of Astoria, Oregon Territory, for a very well prepared collection of plants from the vicinity of Cape Disappointment, Washington Territory, containing several species which I did not myself obtain.

The four hundred or more species enumerated does not include probably more than a third of the plants of the Territory, and in the little known alpine regions of the several mountain ranges much novelty doubtless remains for the botanist.

I limited my notes on plants to such additions or corrections as I could make to the already very complete descriptions contained in Torrey and Gray's Flora of North America; in Hooker's Flora Boreali-Americana, and the other works cited in the lists. The localities, range within the Territory, and notes of size, colors, &c., are, however, always given as far as known to me. In some instances the only specimens of species collected were the seed and their envelopes.

PLANTS COLLECTED FROM THE SUMMIT OF THE CASCADE MOUNTAINS,
EASTWARD TO THE UPPER COLUMBIA RIVER, AND NORTHWARD TO THE
FORTY-NINTH DEGREE OF LATITUDE, BETWEEN JULY AND SEPTEMBER,
1853.

RANUNCULUS ALISMAEFOLIUS, Geyer, var? In a marsh not far southeast of Mount Adams; August 12; rare.

DELPHINUM SIMPLEX, Dougl. Common in prairies; from Vancouver eastward; August 12.

ACONITUM COLUMBIANUM, Nutt. (*A. nasutum*, Fischer.) Two varieties found on borders of mountain streams on eastern slope of Cascade range; August 13; rare, 4 feet high, flowers deep blue.

NASTURTIUM LYRATUM, Nutt. Along banks of Columbia river, near the Dalles; November; common.

CLEOME LUTEA, Hooker. South bank of Columbia, from Walla-Walla to the Dalles; not seen northward; November 8 to 15.

SPRAGUEA UMBELLATA, Torr. High on Cascade mountains, east of Mount Adams; August. A single depauperate specimen. "It was known only from the base of the Sierra Nevada in Upper California, where Frémont gathered the specimens described and figured by Dr. Torrey in his *Plantae Frémontianae*."—GRAY.

SIDALCEA MALVAEFLORA, Gray. Small form. (*S. Oregona*, Nutt., in Fl. of N. A.) Common along both sides from the height of 4,000 feet downward; August 12; 2 feet, purple.

MALVASTRUM MUNROANUM, Gray. Near mouth of Okanagan river; October 4. Second flowering on land lately burnt over; orange red. "*M. Thurberi*, GRAY, (*Plantae Thurberianae*,) is the same as this, or at least is the *M. fasciculata*, Nutt., which has been referred to *M. Munroana*."—GRAY.

ERODIUM CICUTARIUM, L'Her. Common along streams on the higher parts of the range east of the summit; August.

GERANIUM INCISUM, Nutt. Not very common at the same time and place. Two feet high, flowers pale purple.

ACER GLABRUM, Torr. (*A. Douglassii*, Hook.) Not abundant. On the mountains east of the summit only; fruit nearly ripe in August; a small tree.

VICIA AMERICANA, Muhl. (*V. Oregona*, Nutt.) Common in damp places.

LATHYRUS PALUSTRIS, Linn. var. Several varieties common with the preceding, but in damper soil.

HOSACKIA PURSHIANA, Benth. and varieties. Common, but out of flower except in shady and damp spots.

ASTRAGALUS (HOMALOBUS) SEROTINUS, n. sp., Pl. V. Near the Columbia river, about latitude 48°. Rare; probably a second growth on burnt ground; October.

"Description.—Cinereous, with a minute strigulose pubescence; stems branching from the perennial root, ascending, slender, angled, often flexuous, (8-15 inches high;) stipules triangular-acuminate, more or less united opposite the petiole; leaflets 9-21, linear (rarely oblong-linear or oblanceolate) mucronate, not rigid, glabrous, or nearly so above, the terminal one resembling the others; peduncles exceeding the leaves; racemes loosely many-flowered, virgate; bracts

much shorter than the at length spreading or recurved pedicels; calyx campanulate, minutely pubescent, its teeth very short; corolla purple; the legume sessile in the calyx, linear, acute, glabrous, or minutely puberulent, 8-10 seeded; the narrow valves considerably convex. Two forms occur, one rather smaller and more cinereous than the other. Leaflets half an inch to one inch long, varying from half a line to two lines wide. Corolla four or four and a half lines long. Legume nine or ten lines long, a line and a half wide; neither suture in the least introflexed or tumid; the funiculi short. To none of Nuttall's too numerous species of *Homalobus* can this be referred. It most resembles his *H. decumbens*, but is less rigid, not silky-canescens, and has very much shorter and blunter calyx-teeth. It may possibly be the obscure *Astragalus miser* of Douglas, but the pubescence of the calyx is seldom and slightly blackish."—GRAY.

LUPINUS SERICEUS, Pursh. Common on higher parts of eastern slopes in the pine forest, growing three feet high, and in August nearly past flowering.

L. LEUCOPHYLLUS, Lindl. In similar localities. A very beautiful plant three feet high, with long spikes of blue flowers.

SPIREA BETULAEFOLIA, Pallas. Collected near 49th° on the Okanagan river flowering a second time in October. Seen also on summit of range in July; 3 feet high.

POTENTILLA GRACILIS, Dougl. Abundant on the prairies mostly east of the range.

EPILOBIUM PANICULATUM, Nutt. Common along streams; August; 4 feet high.

OENOTHERA ALBICAULIS, Nutt. A single specimen found in flower along the Okanagan river, in October, on ground lately burnt over.

MENTZELIA (BARTONIA) LAEVICAULIS, Torr & Gray. Found in flower on the plains from the Wenass river north, to the 49th°; August; 2 feet; yellow.

GALIUM RUBIODES, Linn. Common in damp soil, flowering in August.

BRICKELLIA OBLONGIFOLIA, Nutt. Common on branches of the Columbia; flowering August 20. Odor peculiar and not unpleasant.

MACHAERANTHERA CANESCENS, Gray, var. (*Dieteria divaricata*, Nutt.) Common on gravelly shores of the Yakima, and other rivers; flowering in August.

ASTER SALSUGINOSUS, Rich, var. Rare on banks of Yakima river. Flowering in September; a foot high; flowers purple.

A. MULTIFLORUS, Willd. Two varieties collected on the plains in October. Two feet high; flowers white.

ERIGERON DOUGLASSII, var? *eradiatum*. Sandy pine forest on the table-land, east of Mount Adams; August. "As far as can be judged from the poor specimens, this accords pretty well with *E. Douglassii*, TORR. & GRAY; except that the heads are rayless." GRAY.

SOLIDAGO GIGANTEA, Aiton. Common along streams on east side, growing 6 feet high.

LINOSYRIS ALBICAULIS, Torr. & Gray. Near Yakima and its branches, flowering in September, when this and a few other compositæ were the only plants showing signs of life; 5 feet high and very ornamental.

L. VISCIDIFLORA, Hook. Found common along Snake river in November, but not seen northward. Accords with *L. viscidiflora*, except that the flowers in these specimens were not viscid. A large shrub much less beautiful than the last.

GRINDELIA DISCOIDEA, Nutt. Banks of the Columbia near latitude 48°; flowering in September a foot high. "Not the species so called by Hooker and Annot; which is *G. anomala*, D.C. This specimen has heads as large as those of *G. squarrosa*, from which, except in the want of

rays, it is hardly distinguishable. Indeed, this and *G. nana*. Nutt. (wrongly joined to *G. humilis*, Hook. & Arn.) are probably to be referred to *G. squarrosa*." GRAY.

CHRYSOPSIS VILLOSA, Nutt. Yakima valley, August 15.

XANTHIUM STRUMARIUM, var. *Canadense*, Torr. & Gray. Yakima valley, August 20; common, 2 feet high.

HELIANTHUS LENTICULARIS, Dougl. Banks of Columbia near latitude 48°; September 20. Common; growing 6 feet high.

GAILLARDIA ARISTATA, Pursh. Abundant on prairies from Vancouver eastward; June to October.

HELENIUM AUTUMNALE, Linn. Collected in flower on southern banks of the Columbia; November, common.

ARTEMISIA CANADENSIS, Michx. Common on the upper Columbia and its branches; collected in flower about September 1.

A. DRACUNCULOIDES, Pursh. Noticed only on sandy hills near mouth of the Okanagan river; October 3, in flower.

A. TRIDENTATA, Nutt. A shrub 3 to 7 feet in height, with stems six inches in diameter at the base. Commonly called "Wild Sage," but with more of the flavor of turpentine, combined with intense bitterness, which it imparts to the flesh of the "Sagefowl" feeding on its leaves, as well as to meat laid on it for a short time. Common on the sandy plains of the interior, commencing to flower in October.

A. TRIFIDA, Nutt. In general appearance and leaves much resembles the last, but is only 2 to 3 feet high, and not strongly scented. The top appears to be herbaceous. Seen only on the Okanagan river, in flower, October 3.

A. DOUGLASIANA, Nutt. Common in the valley of the Yakima river. Herbaceous, 2-3 feet high, flowering August 20.

A. LUDOVICIANA, Nutt. In valleys near the Columbia. September 18.

A. FRIGIDA, Willd. Met with only on the upper part of the Okanagan river, near latitude 49°; in flowers October 9.

ARNICA CHAMISSONIS, Less. In flower on southern bank of the Columbia, near the Dalles, November 10.

MALACOTHRIX CREPOIDES, (n. sp.) "glabrous, subcaulescent; stems numerous from an apparently perennial root, slender, diffuse, (a span or more in length,) sparingly dichotomously paniculate, the slender naked branches or peduncles bearing single heads; leaves mostly radical, lanceolate, runcinate pinnatifid, tapering into a petiole, the few cauline sessile by a hastate or auriculate base, mostly small and bract-like; involucre somewhat pubescent, of lanceolate, subulate scales, with a few setaceous calyculate bracts; achenia somewhat contracted at both ends, strongly ribbed, the coroniform border obsolete; bristles of the pappus consimilar and equally deciduous. Radical leaves thin, 3 or 4 inches long including the short and margined petiole. Stems or scapes weak, sometimes sparsely hairy at the base, not much surpassing the leaves. Heads not larger than those of *M. obtusa*, Benth. Involucre 3 lines long. Flowers yellow. Achenia a line long, fusiform-oblong, being somewhat contracted at the base and apex, the terminal areola therefore smaller than the greatest diameter of the achenium. Pappus of very soft and fine bristles, which are barbellulate at the base and early deciduous, with no stronger and more persistent ones intermixed." GRAY.

Collected near the Columbia river about latitude 48° in September.

MULGEDIUM PULCHELLUM, Nutt. In Yakima valley, flowering August 20; common.

CAMPANULA LINIFOLIA, Lam. Collected near summit of Cascade range, but common in prairies from Vancouver eastward.

PYROLA DENTATA, Smith, *var. integra*. On high wooded hills, east of Mount Adams; August 12th; in fruit. "This is just the *Pyrola dentata* figured by Hooker, only that the oblong obovate leaves are entire, or, at most, with mere vestiges of a few teeth, in some cases."—Gray.

PHELIPCEA CARNOSA, Torr. & Gray, *ined.* Tahk prairie, ten miles from base of Mount Adams; August 12. Corolla pale purple.

"This, the *Orobanche carnosae*, Hook., is certainly a *Phelipcea*, and a close congener of *P. Californica* and *Ludoviciana*; but it invalidates the character of *Aphyllon* (*Anoplanganthus*, Endl.) as to the bracts, rendering it probable that this genus may be merged in *Phelipcea*, since some species of the latter have a nearly regular corolla. These specimens, as to the corolla, correspond better with Hooker's character than with his figure; indeed, the three lower lobes are not even emarginate. The notch of the upper lip varies in depth, as it does in the allied species."—Gray.

PENTSTEMON PROCERUS, Dougl. Common along the banks of the Yakima and its branches; flowering in August, purple; a foot high.

P. RICHARDSONII, Dougl. On the higher parts of the Cascade range eastward; August; purple.

MIMULUS LUTEUS, Linn. Common along the banks of streams.

MIMULUS MOSCHATUS, Dougl. Collected, August 9, on a branch of the Yakima river, but also found in damp shady places on both sides of the mountains.

M. PRIMULOIDES, Benth. Found only, August 12, on the higher part of the Cascade range; yellow.

ORTHOCARPUS BRACTEOSUS, Benth. On the low prairie near the Yakima. August; flower purple.

CASTILLEJA MINIATA, Dougl. On the bank of the Columbia, about latitude 48°. Flowering a second time September 20.

MENTHA BOREALIS, Linn. Common on the Yakima and branches, as well as west of the Cascade range. August.

STACHYS CILIATA, Dougl. With the preceding and more common.

PHLOX SPECIOSA, Pursh. Collected in October on burned prairies, along the Okanagan, flowering a second time. Also found in flower near the Dalles, in November. Six inches high.

COLLOMIA LINEARIS, Nutt. Not uncommon on prairies of the Yakima in July, but mostly out of flower.

GILIA PULCHELLA, Dougl. Common on eastern side of Cascade mountains, but rarely found in flower after June.

G. INCONSPICUA, Dougl. With the preceding, and also westward.

POLEMONIUM PULCHERRIMUM, Hook. Found only near the 49th degree, near banks of streams, in gravelly soil, a few plants having a second growth of flowers on them.

APOCYNUM ANDROSAEMIFOLIUM, Linn. Common east of Cascade range, and also along the Columbia to Vancouver, more rarely.

ASCLEPIAS SPECIOSA, Torr. Found flowering in Yakima valley in August. Plant 4 feet high, flowers yellowish white.

ABRONIA MELLIFERA, Dougl. Collected in flower on the sandy desert south of the Columbia, near Walla-Walla, and noticed nowhere else. November 12; flowers white.

ERIOGONUM NIVEUM, Dougl. Found abundantly near the Columbia, about latitude 48°, growing in dry soil on hill-sides, which looked as if covered with buckwheat in flower. A pretty species a foot high; flowers large, white; September 22.

E. MICROTHECUM, Nutt. Common in the Yakima valley, flowering in August. Flowers small, and very caducous; not ornamental.

E. HERACLEOIDES, Nutt. On the wet, stony shore of the Columbia, about latitude 48°. Second flowering; stems two feet high, woody; flowers pale yellow, large. September 25.

E. NUDUM, Dougl. A common species on the higher slopes east of the mountains. Stems four feet high, naked; leaves mostly radical and large, nearly all faded; flowers white, with purple veins. August 12.

EUPHORBIA MACULATA, Linn. Collected, apparently indigenous, and of very large size, on the sandy desert south of the Columbia. November 8.

SPIRANTHES CERNUA, Richardson. Abundant on damp prairies on top of the Cascade range, and westward. August 10.

CALOCHORTUS ELEGANS, Pursh. A single specimen only, found under pines on the top of the Cascades. August 8.

C. MACROCARPUS, Dougl. Common in flower in the pine forest east of Mount Adams, growing two feet high; the flowers single, but very large, and rich purple. August 12.

PLANTS COLLECTED WEST OF THE CASCADE MOUNTAINS DURING 1854-'55.

NOTE.—S. or G. indicates that Dr. Suckley or Mr. Gibbs collected the plant or the information as to its range and uses. Twelve species, included in brackets, were collected only by Dr. Suckley at Fort Steilacoom.

RANUNCULUS AQUATILIS, Linn.; var. *heterophyllus*, T. & G., (T.) on mud prairie, near Steilacoom; June 1, rare.

R. REPTANS, Linn., (G.) wet grounds near Puget Sound and coast.

R. OCCIDENTALIS, Nutt., (G.) dry prairies about Puget Sound, common; March 28 to June, 2 feet high.

R. RECURVATUS, Poir.; spring on Whidby's I.; April 20, rare.

R. ORTHORHYNCHUS, Hook.; wet grounds in shade, near Steilacoom.

[R. TENELLUS, ? Nutt., (G.) Steilacoom, S.]

AQUILEGIA CANADENSIS, (Linn.) var. *formosa*, Fischer. Common everywhere on dry prairies to elevation of 4,000 feet; April to August. [Steilacoom, S.] "Root edible," G.

DELPHINIUM MENZIESII, (D. C.) Whidby's I.; April 20, 1 foot, rare; a large form, flowers deep blue.

D. AZUREUM, (Mich.) Common in prairies near Columbia river and eastward.

ACTEA ARGUTA, (Nutt.) Common in fir forests, Vancouver to Olympia; 4 feet high. Flowers in May, white; fruit ripe in July, both red and white on different plants.

BERBERIS AQUIFOLIUM, (Pursh.) Abundant in fir forests and across Cascade mountains eastward, not west of Coast mountains; flowers in March, fruit ripe in July; called "Oregon grape;" eatable when cooked. Fort Steilacoom, (S.)

B. NERVOSA, (Pursh.) With the preceding, west of Cascade mountains, (only?) flowering at the same time; the flowers only differing in their larger size. Both are similarly fragrant; stems creeping beneath the surface, the ends only rising a few inches.

ACHLYS TRIPHYLLA, (DC.) Vancouver to Olympia, in fir forests. Flowers May 1, common, "A decoction of the root used for pains in the breast." (G.)

NUPHAR ADVENA, (Aiton.) Ponds on mountains and near coast, April.

CHRYSEIS CALIFORNICA, (Hkr. & Arnott.) Garden near Steilacoom. Introduced? Agrees nearer with this than *C. Douglassii*, which I did not meet with in the Territory. Flowers 3 inches wide, orange; June.

DIELYTRA FORMOSA, DC. (G.) Common in rich grounds; Cascades to coast. April to July.

CORYDALIS SCOULERI, Hkr., (C.) Rocky edges of brooks in mountain forests, 3 feet; June 15.

NASTURTIUM CURVISILIQUA, Nutt., (T.) Steilacoom; common in wet grounds on prairie, 2 feet high; June.

N. PALUSTRE, DC. Marshes along coast, common; June.

BARBAREA VULGARIS, B. Bix., (G.) Abundant in damp meadows, everywhere to coast; May.

ARABIS HIRSUTA, Seeys., (T. & G.) Common in dry prairies, Steilacoom and Shoalwater bays; May.

CARDAMINE ANGULATA, Hkr., (C.) March 4 to May. Common in shady rich woods everywhere.

C. HIRSUTA, Linn., *vars. β. & γ.*, (G.) Abundant in wet grounds everywhere; April.

C. OEIGOSPERMA, Nutt., (T.) April; Whidby's I. Less common.

DENTARIA TENELLA, Pursh. Whidby's I., in damp woods; April; tuberous, flowers purple.

SISYMBRIUM CANESCENS, Nutt., (T.) Prairies, Whidby's I., April. Common, 2 feet high.

SISYMBRIUM DEFLEXUM, Harvey, (G.) *var?* (not in Fl. of N. A.) Sandy prairie at Shoalwater bay, not common, June, 4 feet high; May to July. "This seems to be a very luxuriant state of the species of Coulter's California collections. Having been collected by Dr. Parry in California, it will be characterized in the botany of the Mexican boundary survey." Gray.

ERYSIMUM ASPERUM, DC., (T.) Dry prairies near Steilacoom, not common; June 1.

DRABA NEMORALIS, Ehrh. *var. β.*, (T.) Prairies on Whidby's island; March 20; common.

CAPSELLA BURSA-PASTORIS, Moench., (T.) Prairies on Whidby's island. Introduced?

VIOLA ADUNCA, Smith, (G.) "Probably the same specifically as *V. canina*."—GRAY. Dry sandy prairies, Whidby's island and coast; blue; March 5. (Steilacoom, S.)

V. NUTTALLII, Pursh., (T.) Dry prairies, Whidby's island; March 20; common; yellow.

V. GLABELLA, Nutt., (G.) Damp, shady woods near coast; 10 inches; May 1; yellow.

DROSER A ROTUNDIFOLIA, Linn. Sphagnous swamps, near mouth of Columbia river; July.

HYPERICUM SCOULERI, Hooker. Common in prairies everywhere; June.

PARONYCHIA RAMOSISSIMA, (DC.) (G.) Sandy prairie along coast at Shoalwater bay.

SPERGULARIA RUBRA, Persoon, (G.) Sandy prairie along coast at Shoalwater bay; May.

HONCKENYA PEPLOIDES, Ehrh. *var. oblongifolia*, Torr. & Gr., (G.) Sandy salt marsh, with the preceding; September.

- SAGINA PROCUMBENS, Linn., (G.) With the two preceding; May.
- MÆHRINGIA LATERIFLORA, Linn., (T.) Dry prairie near Steilacoom; June.
- (ARENARIA TENELLA, Nutt., (G.) Steilacoom, S.)
- (A. MACROPHYLLA, Hook. Steilacoom, S.)
- STELLARIA NITENS, Nutt., (T.) Dry prairies; June; 6 inches; white.
- STELLARIA BOREALIS, Bigelow, (*crispa*. Cham. & Schlecht.) (G.) Damp grounds near coast; March 1; common. (Steilacoom, S.)
- CERASTIUM ARVENSE, Linn., (T.) Dry prairies; everywhere common; May to August.—(S.)
- SILENE SCOULERI, Hkr. Prairie near Vancouver and on mountains; July; common.
- CALANDRINIA MENZIESII, Hkr., (T.) Wet ground prairies near Steilacoom; not common; May.
- Also a dwarf hirsute variety in dry sandy soil, Str. De Fuca; April 5.
- CLAYTONIA ALSINOIDES, Sims, (G.) Common in shady wet grounds; May. (Steilacoom, S.)
- C. PERFOLIATA, Donn., (G.) In similar situations.
- (C. PARVIFLORA, Dougl., (G.) Steilacoom, S.)
- C. PARVIFOLIA, Moeh., (G.) On wet rocks, logs, &c., on coast; Shoalwater bay; July.
- C. SPATHULATA, Dougl., (G.) Sandy soil, among logs, &c., on coast; Shoalwater bay; June.
- C. CHAMISSONIS, Esch. & Ledeb. (*C. aquatica*, Nutt.,) (T.) Wet ground near Steilacoom; rare; May 20; creeping.
- C. DICHOTOMA, Nutt. Wet prairie, Whidby's island; May 23; rare; two inches high.
- GERANIUM CAROLINIANUM, Linn., (T.) Abundant on prairies; June to December.
- G. ALBIFLORUM, Hooker. Common in woods near Vancouver; June.
- IMPATIENS FULVA, Nutt., (T.) Mouth of Columbia river; July; seen nowhere else.
- OXALIS OREGONA, Nutt. Shady woods along Columbia river, &c.; June; common.
- MALVA BOREALIS, Linn., (T.) (Not in Fl. of N. A.) A single specimen found at Johnson's Point, Puget Sound; August 26; in flower; purple; six inches high; introduced. (?)
- SIDALCEA MALVAEFLORA, Gray, (G.) Along edges of brackish marshes, near coast; six feet high; flowers one and a half inch in breadth; an elegant plant. The specimens collected on Cascade mountains, in 1853, are only about one-third these dimensions; the *S. oregana*, Nutt., now merged in above.
- ACER. MACROPHYLLUM, Pursh., (G.) "White maple;" common in the forests, from Cascade mountains to coast; flowers May 15; leaves just expanding; forty to ninety feet high. (Steilacoom, S.)
- A. CIRCINATUM, Pursh., (G.) "Vine maple." Wet woods from mountains to coast; flower, reddish purple, April 20; leaves turn scarlet in autumn.
- A. GLABRUM, Torr., (T.) Smooth maple. Found west of Cascade mountains, only on Whidby's island; rare; flowering March 27; male flowers only found; greenish, in axillary fascicles, with very short pedicels; there only a shrub, but collected in 1853, east of the mountains, in fruit, growing thirty feet high.
- OREOPHILA MYRTIFOLIA, Nutt. Rare in woods near Fort Steilacoom; flowering in May; stragglers from the eastern mountains.
- FRANGULA PURSHIANA, DC., (G.) Common on borders of forests; called "bearwood;" berries eaten by bears, but not by the Indians. "*Rhamnus purshianus*, DC., Hkr., &c. A genuine Frangula."—GRAY.
- CEANOTHUS OREGANUS, Nutt. Common in thickets about Vancouver, &c.; June.

C. THYRSIFLORUS, (?) Esch., (T.) Found by me only on gravelly banks near Steilacoom; differs from the California plant in size, (only four feet;) *round* branches and *white* flowers; May 15.

VICIA GIGANTEA, Hooker. Common along coast and at Steilacoom in sand, climbing for 20 feet over bushes, &c.; May 10; seeds eatable.

V. OREGANA, Nutt., (T.) "Small form." A variety of *V. americana*, according to Dr. Gray.

LATHYRUS MARITIMUS, Bigel., (G.) Abundant on sandy prairies along sea-shore; April to July.

L. POLYPHYLLUS, Nutt., (T.) Abundant in fir forests from Columbia river north, presenting several varieties; June to July; purple.

L. VENOSUS, Muhl., *var.*, (T.) Fir forests Vancouver to Steilacoom; June; common.

L. PALUSTRIS, Linn., (G.) *vars. a. β.* Common everywhere in wet ground; May to October.

L. (?) VILLOSUS, Torr., (Expl. Exped. coll. ined.,) (T.) Dry, shady fir forest near Steilacoom; May 23; rare.

OROBUS LITTORALIS, Gray, PLATE VI. *Astrophia littoralis*, Nutt. Sandy sea-shore near mouth of Columbia river at high water mark; common; flowers pale blue and white; seeds few, as large as small peas; collected in flower May 23. "Villous; canescent all over; stems numerous from creeping root stocks, decumbent or ascending; stipules almost as long as the leaf, ovate or oblong, obtuse, the upper semihastate; leaflets one to three pairs, and with a usually smaller or imperfect terminal one or a pair of such, linear spatulate; racemes, five to ten flowered, dense, on an elongated peduncle; legume oblong, villous. *Astrophia littoralis*, Nutt, in Torr. & Gray, *Fl.* 1, p. 278. The specimens are in blossom, (while those of Nuttall were in fruit,) and the flowers are just those of *Orobus*, to which genus the plant undoubtedly belongs. The style accords with that of *Orobus vernus*, except, perhaps, the dilated and flattened portion extends further down; nor does the pod furnish any distinctive character."—GRAY.

PSORALEA PHYSODES, Dougl. (G.) Common on prairie near Steilacoom; June, whitish yellow, (S.) "Leaves used as a poultice."—GIBBS.

TRIFOLIUM MICROCEPHALUM, Pursh. (G.) Common on inland prairies; 2 feet high. (Steilacoom, S.)

T. FIMBRIATUM, Lindl. *var.* (G.) Prairies of interior and dry parts of marshes near coast; June, flowers purple, very variable, 1—2 feet, (S.)

T. PROCUMBENS, Linn. (G.) Cultivated ground; probably introduced; June.

(*MEDICAGO SATIVA*, Linn. (G.) Steilacoom, introduced, S.)

M. PARVIFLORA, Desf. (G.) About houses, Shoalwater bay, introduced.

HOSACKIA BICOLOR, Dougl. (G.) Common on prairie near Steilacoom; June, in wet soil, flowers yellow and white.

H. DECUMBENS, Benth. In dry soil with preceding; June, flowers yellow and red, (S.)

H. PARVIFLORA, Benth. (G.) On sandy prairie, Steilacoom and along the coast; June, flowers very small, red and yellow.

LUPINUS MICRANTHUS, Dougl. (T. & G.) Common in gravelly soil under shade, on prairie near Steilacoom; May 20th, flowers blue, white, or pink on different plants, size and shape of leaves variable.

L. LEPIDUS, Dougl. (G.) Open gravelly prairies about Puget Sound. About a foot high, in flower; June 10th, violet purple. The only fragrant species I found.—(S.)

L. POLYPHYLLUS, Lindl. (T.) Common in damp, rich woods near Steilacoom; June, often 5 feet high, the raceme $1\frac{1}{2}$ foot long, color light or dark purple.

L. NOOTKATENSIS, Dougl. (G.) Sandy prairie along coast north of Columbia river; May 20th, flowers blue, with white keel. Differs from the description in wanting the "red and yellow veins," and the leaflets are pubescent on *both* sides. Stems procumbent, spreading, 2 feet long. The only species I found along the coast. The *L. littoralis*, Dougl., somewhat resembles this, but I met with none of which the roots were used by the Chenooks as food. They *do* dig in the same place the roots of an *Abronia*, which he may have mistaken for those of lupine. This species is said to grow on "rocky shores" which I have never examined.

L. LAXIFLORUS, Dougl. (T.) Very abundant on dry prairies of the interior, forming shrubby-looking tufts two feet high, the whole plant with a grayish appearance. Flowers pale purple, blue, or white, in racemes 6—12 inches long; June 10th, Steilacoom, (S.)

L. FLEXUOSUS, Lindl. ? A more shrubby species, growing only in *dry woods*, and flowering a month earlier near Steilacoom. Flowers, larger, more ornamental, violet. Plant three feet high.

CERASUS MOLLIS, Dougl. (G.) A common tree on the borders of woods, &c., 25 feet high. Bark and form of tree very similar to the cultivated cherry. Flowers, April 1st, large, fragrant. Fruit, black, bitter; as large as a pea; ripe in June.

C. DEMISSA, Nutt. (T.) Banks of brooks near Steilacoom. White, June. Flowers large, many staminate only.

NUTTALLIA CERASIFORMIS, T. & G. (G.) A common shrub in wet grounds, especially on the brackish marshes of the Chehalis above tide water, &c., 6 feet high; flowers in March. Whole plant with the odor of *Staphylea trifolia*. Berries black, bitter; ripe in July.

SPIREA OPULIFOLIA, Linn. Not rare, along brooks, &c.; Steilacoom, May 15th.

S. DOUGLASSII, Hkr. (G.) Abundant in wet grounds, on prairies, &c., throughout forest regions; July, 5 feet high. Besides the distinctions mentioned, I find the leaves only half as large as in *S. tomentosa*, and the small branches purplish, instead of rusty brown. Panicles smaller and denser.

S. MENZIESII, Hooker. Rare on damp prairie near Steilacoom, near woods. Flowers, June 20th. Stems simple, two feet high only, ending in large panicles of pale rose colored flowers; leaves in this specimen much paler below than above, $1\frac{1}{2}$ inch long and $\frac{1}{2}$ inch wide; flowers larger than in *S. salicifolia*, as found in New Jersey. Whole appearance intermediate between this and *S. tomentosa*.

S. ARIAEOFOLIA, Smith. A common shrub about Vancouver, but rare near Puget Sound; 12 feet high; June 15th, (Steilacoom, S.)

S. ARUNCUS, Linn. (G.) Abundant on exposed clay banks, along coast, and at Puget Sound; July 1st.

GEUM MACROPHYLLUM, Willd. (G.) Common in wet shady grounds; May 15th.

GEUM TRIFLORUM, Pursh. (T.) Rare; on Whidby's island, (Penn's cove,) April 12th. Flowers richer purple than common.

POTENTILLA NORVEGICA, Linn. "*var.*, carpels glabrous," (T.) Rare on dry prairie near Steilacoom, June 20th.

P. GRACILIS, Dougl. (G.) *B. flabelliformis*, Nutt. Abundant on dry prairies of the interior; Steilacoom, May 15th, (S.)

P. ANSERINA, Linn. (G.) Abundant in salt meadows along the coast; June to August. I never met with *var. β. grandis*.

COMARUM PALUSTRE, Linn. (G.) In brackish marshes, Shoalwater bay; July 10th, not very common.

FRAGARIA VIRGINIANA, Ehrh. According to Professor Gray both this and the next two species are found in Washington Territory. My specimens, from various parts of the Territory near the coast, present so many shades of variety that, *without the fruit*, I cannot decide on more than two species. On the interior prairies they begin to flower in February, and continue till July, the fruit ripening from May 1 to August. (On summit of Cascade mountains.)

F. VESCA, Linn. (G.) Certainly grows on the prairies of the interior.

F. CHILENSIS, Ehrh. (G.) On sandy prairie along the coast. Flowers much larger than the others are, commonly; open in May. Fruit ripe in *July*, small, but I have not found it more "villous" than the other species; flavor the same. (Steilacoom.)

RUBUS NUTKANUS, Moc. (G.) Abundant in dry hilly woods, everywhere; May 1. Fruit ripe in July, dry and acid.

R. LEUCODERMIS, Dougl. Common in dry open grounds, burnt woods, &c.; May. Fruit ripe in July, like the common "blackcap," but larger and covered with a white bloom.

R. SPECTABILIS, Pursh. (G.) In damp, shady places, especially along the coast. The bright purple flowers expand in February to April. Fruit ripe in July; very fine in good situations.

R. TRIVIALIS, Michx. Not common. Wet, shady woods near Olympia. Flowers in May; much resembles *R. hispidus*, Pursh. Fruit not seen. Differs from description, in its far northern locality, in its leaves, which are not coriaceous, and in being more villous. "A form very like it occurs in Sonora."—THURBER.

RUBUS MACROPETALUS, Dougl. (G.) Common on dry hills, forming prostrate branches, and resembling *R. Canadensis*, Linn. Fruit very good; June.

ROSA FRAXINIFOLIA, Bork. (G.) Common in wet ground, everywhere; June 16; 6 feet.

ROSA GYMNOCARPA; Nutt. On borders of woods in dry soil, (Vancouver and Puget Sound.) Not rare; May 20. Flowers small, dark red, and *inodorous*.

PYRUS RIVULARIS, Dougl. Oregon crab apple. Wet grounds everywhere west of Cascade mountains; April, May. Fruit small, but good; ripe in July. Very useful for grafting on.

P. AMERICANA, DC. Mountain ash. On higher parts of Cascade mountains; rare. Fruit collected in July, ripe, larger than common, and of a bright orange color.

AMELANCHIER CANADENSIS, Linn., *var. γ.*, Torr. & Gray. Abundant on borders of woods of the interior, but rare along the coast; May. Whole plant larger, and fruit much larger and finer than in New Jersey. "Service berry." (Steilacoom, S.)

EPILOBIUM ANGUSTIFOLIUM, Linn. (G.) Exceedingly abundant, especially in the dead forests, where its bright flowers color the surface for miles together in July; flowers from June to October, purple. (Steilacoom, S.)

E. TETRAGONUM, Linn. (G.) Not uncommon in large prairies near the coast; July.

E. COLORATUM, Muhl. Abundant in wet grounds everywhere; June to October.

E. MINUTUM, Lindl. (G.) Rare on the dry prairies near Steilacoom, in shade; June 10; flowers very small, pale purple; plant somewhat decumbent, branching from the base; leaves nearly linear; flowers much smaller than in *E. paniculatum*, which it seems to resemble much.—(S.)

E. PANICULATUM, Nutt. (G.) With *E. coloratum*, but less common; June to August. (*E. luteum*, said to be found there, I never met with.)

E. LUTEUM, Pursh. ? (G.) Without flowers. (Steilacoom, S.)

ÆNOTHERA BIENNIS, Linn. (T.) Very common on every prairie throughout the country. A very large flowered variety grows in meadows at the mouth of the Columbia, with low, spreading, slender branches, not more than a foot in length, in habit resembling *Æ. fruticosa*.

Æ. VINOSA, Lindl. (G.) *O. Romanzovii*? On the prairies near Vancouver and Steilacoom I collected two quite distinct purple species growing in *the same soil*, and apparently holding their characters well. The present grew two feet high, slender; leaves distinctly peduncled, lanceolate, linear, an inch long or more, alternate; capsule sub-pedunculate, as long as the leaves, very narrow; tube of the calyx half as long as the petals; flowers an inch in breadth, *pale purple, not spotted*. The other:

Æ. QUADRIVULNERA, (G.) Dougl. (*O. amœna*? *O. Lindleyi*?) more branching and shorter; leaves sessile, oblong, lanceolate, half as long as in the preceding; capsule much thicker, shorter, closely sessile, pubescent; calyx half as long as the *dark purple* petals, which have a deep red spot at their base.

Both vary much in size with soil, but seem always to be in company, and to show the same relative distinctions. Neither is found west of the Coast range. The color of the stigma, I think, varies with the time of expansion, and thus several species appear to have been made of these two. My specimens do not agree exactly with the descriptions of either of those they are referred to, but have some characters of the others quoted with them. (Steilacoom, S.)

Æ. VINOSA, Lindl. ? (G.) (Steilacoom, S.)

Æ. LEPIDA, Lindl. (G.) (Steilacoom, S.)

CIRCÆA ALPINA, Linn. Not rare in dark, damp woods about Puget Sound; July.

MEGARRHIZA OREGONA, Torr. & Gray. (G.) Common in the western portions of the Territory. On the dry prairies about Puget Sound it forms bushy tufts, two feet high and four or more wide, being evidently somewhat stunted. Where the soil is richer, and in the shade, it climbs thirty or forty feet over trees, &c., and has much larger leaves. Though nearly ripe, the fruit in July is as large as the fist, round, with three or four grooves and scattered, weak, soft prickles. The rind is about $\frac{1}{4}$ of an inch thick, and the inside entirely filled by the large seeds; root sometimes large enough to fill a flour barrel, tough, white, and very bitter. It is said to have strong cathartic properties. That of the Californian plant has been used to make "Stoughton's bitters!"

RIBES DIVARICATUM, Dougl. (G.) The most abundant species throughout the forest region, growing on borders of woods, shores, &c.; flowers in April; color deep purple, sometimes yellowish; fruit ripe in July, small, but good.

R. NIVEUM? Lindl. A species grows in the Coast mountains, about the head of the Chehalis, which may be this. I saw the unripe fruit in July, then as large as a musket ball, slightly crisped, and said to be excellent when ripe; plant shrubby, spiny; leaves small, trifid, and toothed. It is now cultivated by Mr. Durgin in his nursery, by Mr. Gibbs and others.

R. LACUSTRE, Poir. Whidby's island, in damp woods; rare; April 15; also in the higher parts of the mountains southward.

R. LAXIFLORUM, Pursh. A common species in damp maple groves along the coast; flowers April 1; lurid purple, smell unpleasant; fruit nauseous, small.

R. BRACTEOSUM, Dougl. (G.) Dark woods, along streams, from Cascades to coast. Flowers yellowish green; fruit black, as large as a pea, unpleasant; April 1.

R. SANGUINEUM, Pursh. (G.) Abundant in open fir forests; March 15; very beautiful in flower; fruit small and tasteless, bluish. (Steilacoom, S.)

SEDUM SPATHULIFOLIUM, Hook. (G.) On bare rocks about mouth of the Columbia; July; yellow. The *S. Oregona* I did not find there, but think I saw it on the top of the Cascade mountains, in August, 1853.

SAXIFRAGA INTEGRIFOLIA, Hook. (G.) Prairies of middle region; March 20 to June; leaves much thinner and more entire than in *S. Virginiensis*; scape fewer flowered and more racemose flower smaller. (Steilacoom, S.)

HEUCHERA MICRANTHA, Dougl. Common in moist woods; May; flowers white.

H. CYLINDRICA, Dougl. (T.) Not very common in dark woods near Steilacoom; June 11; flowers greenish yellow; scape three feet high. (S.) "Leaves bruised and applied to boils by the Nisquallies." (G.)

TOLMIEA MENZIESII, Torr. & Gray. Common in wet, shady woods, along rocky streams; June and July; flowers purple.

TELLIMA GRANDIFLORA, Dougl. (G.) Not rare on damp clay banks, &c., at Puget Sound and along the coast; May 1; flowers cream color, handsome, very similar in appearance to those of *Silene stellata*.

LITHOPHRAGMA PARVIFLORA, Nutt. Abundant on prairies of Whidby's island, &c.; March 25.

TIARELLA TRIFOLIATA, Linn. (G.) Common in dark, damp woods, especially near the coast; May to July.

CHRYSOSPLENIUM GLECHOMÆFOLIUM, Nutt. (G.) Rare, in wet woods about Shoalwater bay; June 4; yellowish green.

PHILADELPHUS GORDONIANUS, Lindl. Very common in dry, open grounds about Vancouver; rare about Puget Sound; six feet high; July. As *strongly scented* as the garden "mock orange." The distinctions of this and *P. Lewisii* seem obscure. "Leaves used by the Indians instead of soap." (G.)

SANICULA MENZIESII, Hook. & Arn. (T.) Prairies, common; April 20 to June; yellow, 1½ feet high.

S. BIPINNATIFIDA, Dougl. (T.) Rare on prairie at Penn's Cove, Whitby's island; April 20; purple flowers.

S. BIPINNATA, Hook. & Arn. *var.* (T.) Prairie near Steilacoom; June; flowers yellow, two feet high.

EDOSMIA GAIRDNERI, Hook. & Arn. (G.) Common on prairies near Puget Sound. (Steilacoom, "root eaten by the Nisqually Indians, and called S'hah-gok," S.)

OENANTHE SARMENTOSA, Nutt. (G.) Common in wet grounds along coast; rarer at Steilacoom. July to September; flowers white.

LIGUSTICUM SCOTICUM, Linn. (G.) Not rare along coast at Shoalwater bay; July. "Green stems peeled and eaten by the Indians." (G.)

CONIOSELINUM FISCHERI, Weim. & Grab. (G.) Common in moist sandy prairies, both on coast and interior; July to September; flowers white. Plant with the odor of anise when in dry soil, but disagreeable in moist ground. (Steilacoom, S.)

ARCHANGELICA PEREGRINA, Nutt. (G.) Wet alder groves at Shoalwater Bay; rare; 6 feet

high; July to September. "Apparently not the same as the plant of the coast of New England, referred to this species, though nearly allied to it. Both exhibit a more or less manifest involucre."—GRAY.

CYMOPTERUS? LITTORALIS, (n. sp.): "Low, subcaulescent; petioles elongate, dilated, and sheathing at the base, above with the peduncles and rays tomentose-villous; leaves coriaceous, deeply 3-lobed or more commonly trisected; the divisions roundish, callose-serrulate, often 3-lobed or 3-parted, densely tomentose beneath, glabrous and finely reticulated above, the veinlets impressed; umbels shorter than the leaves; leaflets of the involucre and involucre subulate, the latter equalling the glomerate (whitish) flowers; calyx-teeth short and subulate; wings of the fruit equal (broad and white.) "On the sands of the sea-shore at Shoalwater bay, scarcely rising above the surface, where its leaves lay prostrate. These are dark green and glabrous, and nearly white below, drying up, but not deciduous; flowers gray and white; ripe fruit, white."—*Dr. Cooper*. Root thick, petioles stout, a span long. Leaflets and divisions of the leaf 1 or 2 inches long; peduncle 1 to 2 inches long; rays 10 to 12, half an inch to an inch in length; umbellets capitate, many-flowered. The very little fruit gathered is imperfect, but accords with that of *Cymopterus*, (except that the vittæ were not made out,) but the foliage is widely different from that of any species before known."—GRAY.

PEUCEDANUM LEOCARPUM, Nutt. (G.) Prairies generally; on sandy sea-shore varies with leaves broader and shorter; stem coarse, 1 to 2 feet; June. "The green stems are peeled and eaten." (G.)

P. FENICULACEUM, Nutt. (T.) Prairies about Puget Sound; March 15 to June —; common; flowering when two inches high to one foot. "Root boiled and eaten." (G.)

HERACLEUM LANATUM, Michx. (G.) Abundant on sandy prairies along coast; May.

DAUCUS PUSILLUS, Mich. (G.) Rare on sandy prairie near mouth of Columbia; July. (Steilacoom, S.)

GLYCOSMA OCCIDENTALIS, Nutt. (T.) Common on rich prairies in shade; June to August.

CONIUM MACULATUM, Linn. "Large form of the northwest coast." (T.) Abundant everywhere in wet grounds, the large variety mostly near the sea, 8 feet high; June to October.

ECHINOPANAX HORRIDUM, Smith, (G.) Common in springy woods, from the highest parts of the Cascade mountains to the coast; May 15. (Steilacoom, S.)

CORNUS DRUMMONDII, (G. A. Meyer,) *C. sericea*, var? Torr. & Gray. Abounds along the edge of rivers, in sandy soils, down to tide-water. I think this is distinct from the following, though my specimens are too incomplete to decide from.

C. PUBESCENS, Nutt. (T.) Not very common, in damp woods, Steilacoom; May 28; 15–20 feet high. Bark *greenish*, twigs *dark purple*, leaves from two to four inches long, one to two and a half wide, ovate, obtuse or mucronate, glabrous, petals white.

C. NUTTALLII, Aud. (G.) Common in the fir forests, about as far north as Steilacoom; May 1. Very similar to *C. Florida*, and about twice as large in all parts. Much more ornamental in flower.

C. CANADENSIS, Linn. Cascade mountains, 4,000 feet to the mouth of Columbia; May.

LINNEA BOREALIS, Gronovius. (G.) Common in the same situations as *Cornus Canadensis*; June. (Steilacoom, S.)

SYMPHORICARPUS RACEMOSUS, Mich. (G.) Common along river banks down to tide-water; June. (Steilacoom, S.)

S. OCCIDENTALIS, R. Br. (T.) With the preceding, but less common; June to August.

LONICERA OCCIDENTALIS, Hook. Not uncommon about Puget Sound or borders of prairies. Resembles *L. sempervirens* in habit and growth, but the flowers are much less beautiful and smaller; orange; May 1 to June. Limbs of the corolla slightly unequal.

L. HISPIDULA, Dougl. Not very common; woods near mountains; May-June. Flowers rose.

L. (XYLOSTEUM) INVOLUCRATA, (Rich.) Wet ground, Cascade mountains to coast, especially about brackish marshes; April to July. Corolla bright yellow, bracts purple, becoming much larger and brighter as the fruit ripens. Berries united, dark rich purple. A variety collected in flower, April 22, on Whidby's island has all parts much smaller, the leaves ovate-lanceolate, flowers paler, and bracts green. The larger form seems rare near Puget Sound.

SAMBUCUS PUBENS, Mich. var. (*S. racemosa*, Hkr.) (G.) Common in the forests, growing 20 feet high; April 20.

S. GLAUCA, Nutt. Plains and prairies on both sides of Cascade mountains; most common eastward. Not west of Coast range; June 20; Steilacoom. Berries much more pleasant than those of *C. Canadensis*; ripe in July; blue.

GALIUM TRIFIDUM, Linn. (G.) Common in the thickets, &c.; June.

G. TRIFLORUM, Mich. (G.) In similar places, everywhere; June.

(*G. APARINE*, Linn. (G.) Steilacoom, S.)

VALERIANA CAPITATA, Willd. Rare; on rocky banks of "Stah-chess" river, near Olympia; May 1; 3 feet high; flowers pink, fragrant.

PLECTRITIS CONGESTA, DC. (G.) Sandy soil along sea-shore and Straits of De Fuca; common. Flowers pink; June and July. Sometimes 3 to 4 feet high, decumbent. (Steilacoom, S.)

NARDOSMIA PALMATA, Hooker. (G.) Common on the sloping clay banks bordering Shoalwater bay and Puget Sound; March 15.

ASTER DOUGLASSII. (G.) This seems to be the only species of this numerous genus common west of the Cascade mountains, in this Territory. It grows in moist meadows, from two to five feet high; the latter on the coast. This large variety has leaves 4 inches long and 1 broad, and, except in the want of "canescent pubescence," seems to approach *A. Menziesii*, Lindl. Rays bright or dark purple; July to September.

ERIGERON SPECIOSUM, DC., var. β . (T.) On dry prairies near Puget Sound. Rare; July; 2 feet. Flowers pale purple.

(*ERIGERON CANADENSE*, Linn. (G.) Steilacoom, S.)

SOLIDAGO CONFERTIFLORA, DC. (G.) Abundant on the sandy sea-shore prairies in dry soil; September; not more than two feet high; raceme very large and dense, 6 inches long. (Steilacoom, S.)

S. ELONGATA, Nutt. var. (T.) Not abundant; in open spots, along Columbia river and sea-shore; not seen near Steilacoom; July; 4 feet high.

GRINDELIA INTEGRIFOLIA, DC. Common on wet meadows near the sea; var. β . near mouth of Columbia river; July. (Steilacoom, S.)

FRANSERIA CHAMISSONIS, Lesson; β . *cuneifolia*, Nutt. (G.) Common in sand hills near edge of salt water along coast; July.

F. BIPINNATIFIDA, Nutt. (G.) In the same situations near mouth of Columbia. Common. Both form bushy, prostrate tufts in the sand. I observed no intermediate forms of the leaves.

BALSAMORHIZA DELTOIDEA, Nutt. (T.) Common on moist prairies of the interior, nearly to top of Cascade range, not west of Coast mountains; July; near Puget Sound. "Root edible." (G.)

BIDENS CERNUA, Linn. (G.) Not common; in swampy salt marshes along sea-coast; September.

BAHIA LANATA, Nutt. (G.) Common on dry plains east of Coast range; June. (Steilacoom, S.)

MADIA RACEMOSA, Torr. & Gray. (G.) (Steilacoom, S.)

ACHILLEA MILLEFOLIUM, Linn. (G.) Abundant everywhere in dry soil. (Steilacoom, S.)

COINOGYNE CARNOSEA, Lesson. (G.) Common on the edge of salt marshes among *Salicornia*, from which it is not easily distinguished when not in flower; July to September; flowers bright yellow.

TANACETUM HURONENSE, Nutt. (G.) Sandy soil along sea-shore and interior prairies; July.

ARTEMISIA DOUGLASIANA, Bess. (C.) On steep clay banks about Shoalwater bay; September. The only species of the genus I found west of the Cascade mountains; 5 feet high, very stout; lower leaves somewhat serrate-toothed on each side; scarcely trifid.

GNAPHALIUM DECURRENS, Ives. (G.) *var? Californicum*, DC. Common on sandy prairies along sea-shore; August; 2 feet.

G. LUTEOALBUM, Linn. (G.) *var? Sprengelii*, Hook. & Arn. In similar situations along sea-shore; August and September; 1 foot.

G. PALUSTRE, Nutt. (G.) In wet sandy soil along sea-shore; not common; August.

G. PURPUREUM, Linn., *var? ustulatum*; Nutt. (T. & C.) Not common; in dry prairie near Puget Sound, and with the preceding along coast; July; 1 foot. "A remarkable white floccose variety."—Gray.

ANTENNARIA MARGARITACEA, R. Br. (G.) A very large leaved form, 4 feet high; along coast; not rare; September.

A. PLANTAGIFOLIA, Hooker. (T.) Dry prairies about Puget Sound; common; July.

CROCIDIUM MULTICAULE, Hooker. (T.) On grassy hill sides; Straits of De Fuca; April 1; flowering when only two inches high, and continuing until a foot high in June; Steilacoom; common.

ARNICA AMPLEXICAULIS, Nutt. (G.) On rocky banks of streams among the coast mountains; July; 2 feet high.

CIRSIIUM UNDULATUM, Spreng. (T.) "A smoothish form;" common in open dry grounds near Columbia river, &c. The only native species west of Cascade mountains; 3 feet high. "The root is eaten."—Gibbs. Canada thistle.

HIERACIUM SCOULERI, Hook. (G.) Common in dry open grounds, burnt woods, &c.; June; rays white; 2 feet high.

MACRORHYNCHUS LACINIATUS, Torr. & G. (T.) *and var. β.* Common on dry prairies about Puget Sound; June and July. Flowering; from 4 inches to 2 feet high. "Root edible." (G.)

M. HETEROPHYLLUS, Nutt. (G.) (Steilacoom, S.)

M. LESSINGII, Hook. (G.) Prairies along sea-shore; June.

MULGEDIUM LEUCOPHEUM, DC. (G.) Common in dry open woods, &c.; August.

SONCHUS ASPER, Vieill. (G.) Common about cultivated ground. Introduced?

CAMPANULA LINIFOLIA, Hkr. Prairies east of Coast Range; common; June 10.

C. SCOULERI, Hkr. (G.) In shade of fir forests; common; June 20; 2 feet. (Steilacoom, S.)

SPECULARIA PERFOLIATA, A. DC. (G.) Prairies; common; June. (Steilacoom, S.)

HETEROCODON RARIFLORUM, Nutt. (T.) Prairie near Steilacoom; rare; growing in cultivated grounds in spreading tufts a foot wide. Flowers either purple or white; June.

GITHOPSIS SPECULARIODES, Nutt. (T.) (Trans. of Amer. Phil. Soc., new series, p. 225.) With the preceding, and similar in growth, but smaller; June 20; purple.

VACCINIUM MACROCARPON, Aiton. (G.) Swamps near coast; abundant; June.

V. PARVIFOLIUM, Smith. (G.) Forests; common; flowers greenish purple; April; fruit red; July.

V. CAESPITOSUM, Mich. Prairies of interior; abundant; April; 6 inches high.

V. OVALIFOLIUM, Smith. Dark forests; not abundant; flowers greenish, rich; fruit blue, sour; August.

V. MYRTILLOIDES, Mich. Cascade mountains over 4,000 feet high; fruit good; ripe in August; brownish purple.

V. OVATUM, Pursh. (G.) Forests; evergreen; flowers pink; February to May; fruit black, sweet; September to December.

ARBUTUS MENZIESII, Pursh. (G.) Gravelly shores and banks, in fir forests; April; white.

ARCTOSTAPHYLOS TOMENTOSA, Pursh. Rare in fir forests; Vancouver to Cascade mountains; fruit unripe in July.

A. UVA URSI, Linn. (C.) Abundant on sandy prairie, from sea-shore eastward; May.

MENZIESIA FERRUGLNEA, Smith. (G.) Along coast; not abundant; 10 feet high; flowers in May; purplish.

M. EMPETRIFORMIS? Gm. Seen on Cascade mountains, at 4,000 feet elevation, flowering in August; rare.

GAULTHERIA SHALLON, Pursh. (G.) Abounds west of Cascade range; flowers in May; fruit resembles the harvest apple in flavor.

RHODODENDRON MAXIMUM? Linn. Common only in woods on Whidby's island, but said to extend along Cascade range southward. In dry gravelly soil 12 feet high. Flowers in April, (Port Townsend, S.)

KALMIA ANGUSTIFOLIA, Linn. (G.) Common in sphagnum swamps; June. A variety approaching *K. glauca*, var. *ovata*.

PYROLA ROTUNDIFOLIA, var. *bracteata*, Linn. (G.) Woods; June; common. (Steilacoom, S.) "This with *P. asarifolia*, Mx.; *P. uliginosa*, Torr.; *P. occidentalis*, B. Br., and *P. picta*, Hook., I take to be but one species."—Gray.

P. ELLIPTICA, Nutt. In similar situations less common; June. "A poultice made of the leaves raises blisters." (G.)

MONESES UNIFLORA, Linn. (G.) Woods, on logs, &c., along coast; rare; June.

CHIMAPHILA UMBELLATA, Pursh., (G.) Dry woods; common; June. (Steilacoom, S.)

PTEROSPORA ANDROMEDEA, Nuttall. Woods; Steilacoom; June; Cascade mountains at 4,000 feet; in August; not common.

MONOTROPA UNIFLORA, Linn. (G.) Forests; rare; July; near Chehalis river.

PLANTAGO MAJOR, Linn. A very large variety in an opening of the forest; Chehalis river; July; apparently indigenous.

P. MARITIMA, Linn. (G.) Sea-shore; common; June 20.

P. PATAGONICA, Jacq. (T.) var. *Gnaphalioides*. Prairie, head of Chehalis; July 4; rare.

ARMERIA VULGARIS, Willd. (G.) Abundant on sandy prairie along coast, coloring large patches, of a fine rose color when in flower; June; one foot high; rare; near Steilacoom.

DODECATHEON MEADIA, Linn. (G.) (*D. dentatum*, Hkr.) Common on prairie; March; one foot high.

TRIENTALIS EUROPEA, Linn. (G.) (*T. latifolia*, Hkr.) Common in shady forests; April. (Steilacoom, S.)

GLAUX MARITIMA, Linn. (G.) Common on sea beach; June.

APHYLLON UNIFLORUM, T. and G. Prairie near Steilacoom; common; May 15.

LINARIA CANADENSIS, Linn. (G.) Common on prairies everywhere; June. (S.)

SCROPHULARIA NODOSA, Linn. (G.) Common in damp ground along coast; June; a large variety.

COLLINSIA GRANDIFLORA, Dougl. (T.)* Prairie near Steilacoom; April; common; one foot.

C. PARVIFLORA, Dougl. (T.) Gravelly shores of Puget Sound; March; blue. These two species seem to run together, both presenting several varieties.

MIMULUS LUTEUS, Willd. (G.) Wet banks and springs in forests; common; May to July.

M. MOSCHATUS, Dougl. (G.) Wet shady woods; common; May to July; one foot. (Steilacoom, G. S.)

M. FLORIBUNDUS, Dougl. (T.) Steilacoom, in wet ground; rare; June 20; one foot.

SYNTHYRIS RENIFORMIS, Benth. (G.) Prairies along Willopa river; March 18; flowers blue.

VERONICA ANAGALLIS, Linn. (G.) Wet shady woods; common; June.

V. SCUTELLATA, Linn. (G.) Common in open marshes; June.

CASTILLEJA PALLIDA, Kunth. (T. and G.) Several varieties, and perhaps another species, abound on the prairies; April to June.

ORTHOCARPUS TENUIFOLIUS, Benth. (G.) Sandy prairies along sea-beach; July; rare. (Steilacoom, S.)

O. HISPIDUS, Dougl. ? (T.) Steilacoom; May; rare.

MENTHA CANADENSIS, Linn. (G.) Common on wet prairies; June.

MONARDELLA ODORATISSIMA, Benth. (G.) Coast prairies; June.

BRUNELLA VULGARIS, Linn. (G.) Common on prairies; June; a large form. (Steilacoom, S.)

"Mixed with grease, and applied to swellings by the Indians."—G.

SCUTELLARIA LATERIFLORA, Linn. (T.) River bank; July; very large.

MICROMERIA DOUGLASSII, Benth. (G.) In woods near Steilacoom; July; fragrant. (S.)

STACHYS PALUSTRIS, Linn. Wet grounds; June; three feet high.

S. CILIATA, Dougl. (G.) *var.* "more hairy." In similar situations, and more common; June.

AMSINKIA LYCOPSOIDES, Lehm. (G.) Sandy sea-shores, &c.; 2 feet; yellow. August to July. (Steilacoom, S.)

MYOSOTIS VERNA, Nutt. (T.) (*inflexa*, Engl. *stricta*, Lin.) Dry prairie, Steilacoom; May 15, rare, 2 feet, blue.

ERITRICHUM FULVUM, A. DC. (T.) Gravelly banks of brooks; Steilacoom; common. Flowers May 15, very fragrant; white, but turns fulvous in drying.

E. CHORISIANUM, DC. ? (T.) Dry prairies near Puget Sound; June; rare.

(E. SCOULERI, A. DC. (G.) Steilacoom, S.)

HYDROPHYLLUM MACROPHYLLUM, Nutt. ? (T.) *var.* A variety with trifid leaves resembling *H. canadense*. Shady river banks; July.

H. CAPITATUM, Benth. (G.) In similar situations; common. July; 2-3 feet; white. (Steilacoom, S.)

PHACELIA CIRCINATA, Jacq. (G.) Abundant in dry openings of the forest; June.

EUTOCA MENZIESII, Benth. (G.) Prairies near Puget Sound, rare; June; 1 foot. (Steilacoom, S.)

NEMOPHILA PARVIFLORA, Benth. (T.) Woods near Puget Sound; June and July; rare.

POLEMONIUM MICRANTHUM, Benth. (T.) Rich soil, prairie, Whitby's I.; April 12; rare.

COLLOMIA GRANDIFLORA, Dougl. (G.) Common on prairies of interior; June; 2 feet, (S.)

C. GRACILIS, Dougl. (T.) Common in the same situations as the last.

GILIA ACHILLIÆFOLIA, Benth. With the preceding; common; July.

G. MICRANTHA, Steud. (T.) With the preceding; June, common, (S.)

G. TRICOLOR, Benth. (G.) In cultivated ground on coast. Introduced?

NAVARRETTIA HETEROPHYLLA, Benth. (T.) Prairie near Puget Sound; June; rare, (S.)

CALYSTEGIA SOLDANELLA, R. Br. (G.) On sandy sea-beach near salt water, common; June 20. Flower large, purple; plant prostrate.

CUSCUTA UMBROSA, Beurick. (G.) "*ex Hooker.*" Common among *Salicornia* on sea-coast. Sept.

SOLANUM NIGRUM, Linn. (G.) A large form, growing chiefly around cultivated grounds Introduced? July to December.

FRAXINUS OREGONUS, Nutt. Ash. River bank above tide-water; June.

ASARUM HOOKERI, Gray. (G.) *A. canadensis*, var. *Hook.* Forests; not common; June. (Steilacoom, S.) "The specimens are not in flower, but it is no doubt a distinct species."—GRAY.

SALICORNIA HERBACEA, Linn. (G.) Salt marshes; abundant.

CHENOPODIUM ALBUM, Linn. (G.) Several varieties about cultivated grounds on sea-shore. Introduced?

BLITUM RUBRUM, Linn. var. *B. humile*, Moq. (T.) Salt marsh at Shoalwater bay; May. Branches decumbent, fleshy; 6 inches long.

ABRONIA ARENARIA, Menz. (G.) Sandy sea-shore nearest to water, spreading. Flowers in June and July; orange yellow, and with the odor of orange blossoms.

A. UMBELLATA, Lamk. (C.) With preceding, a smaller plant; flowers pink, expanding in September; scentless.

POLYGONUM PARONYCHIA, Cham. (G.) Common on dry sandy prairies along sea-coast; July; 2 feet; rose-colored.

P. PERSICARIA, Linn. (G.) About cultivated grounds. Introduced? July.

P. TENUE, Michx. (G.) Sea-shore prairies; June.

P. AMPHIBIUM, var. *AQUATICUM*, Linn. (T.) In lakes about Puget Sound, common; June.

RUMEX SALICIFOLIUS, Weinm. (G.) About salt marshes, etc., common; June.

R. DOMESTICUS, Hartm. ex-Hook. (G.) Introduced? not common. (Steilacoom, S.) "Leaves boiled and eaten by Indians."—(G.)

R. PERSICARIOIDES, Linn. (G.) Common about salt marshes. June; 1 foot.

R. ACETOSELLA, Linn. Becoming common in cultivated prairies. Introduced 20 years since at Nisqually farms, and is now spread for miles around, crowding out everything else in the poor gravelly soil.—(S.)

SHEPHERDIA CANADENSIS, Nutt. Found only on banks near Straits of Fuca; flowering March 10.

QUERCUS GARRYANA, Dougl. White Oak. The abundant and sole species of oak, in prairies. Flowers, May 25.

- CORYLUS AMERICANA, Walter. (C.) Hazel. An abundant shrub in the fir forests; March.
- MYRICA CALIFORNICA? Cham. (G.) Not common in marshes along coast; leaves evergreen, *inodorous*; flowers and fruit not found.
- ALNUS OREGANA, Nutt. (*A. rubra*? Bong.) Alder. Common near coast. See notes on trees.
- A. VIRIDIS, DC. (T.) A shrub 20 feet high, rare; Steilacoom.
- SALIX BRACHYSTACHYS, Benth. *Scouleriana*, Barratt. (G.) Common along coast, &c.; Feb. 20, yellow, 25—30 feet high. Specimens of several other species were collected, but in the uncertain state of our knowledge of western willows, cannot be confidently named.
- POPULUS TREMULOIDES, Michx. Common on mountains and around lakes near Puget Sound.
- P. ANGUSTIFOLIA, Torr. Abundant on river banks above tide-water. The specimens do not certainly identify the other species, but they are probably *P. balsamifera*, Linn., and *P. monilifera*, Ait.
- URTICA GRACILIS, Ait. (G.) Nettle. Abundant in wet woods; July.
- PINUS PONDEROSA, Dougl. Yellow Pine. Prairies near Steilacoom, not common; stunted.
- P. CONTORTA, Dougl.? Scrub Pine. Damp sandy soil, sea-coast and interior. (Steilacoom, S.)
- ABIES CANADENSIS, Michx. Hemlock. Damp forests, common; April.
- A. DOUGLASSII, Sabine. "Red" and "Black Fir." See notes on forest trees. March; yellow.
- A. GRANDIS, Dougl. "Yellow Fir." Young cone green and resinous.
- A. TAXIFOLIA,? Lambert. "White Spruce." Undoubtedly a distinct species,
- A. MENZIESII, Lambert. "Black Spruce." April; flower and cones red.
- THUJA GIGANTEA, Nuttall. "Cedar."
- TAXUS BREVIFOLIA, Nuttall. "Yew." (Oregona in plate.) April; yellow.
- SYMPLOCARPUS KAMTSCHATICUS, Bong. (G.) Wet grounds, in forest; sea-shore to 3,000 feet high on mountains. Flowers March 21. Spathe white. (Steilacoom, S.)
- TYPHA LATIFOLIA, Linn. (G.) Common in wet grounds.
- SPARGANIUM RAMOSUM, Smith, (G.) Banks of streams, rare; June.
- ZOSTERA MARINA, Linn., (G.) Common in bays, in shallow water or mud.
- RUPPIA MARITIMA, Linn. (G.) With the preceding; common.
- TRIGLOCHIN MARITIMUM, Linn. (G.) About the edge of high water in mud, common.
- SAGITTARIA SAGITTIFOLIA,? Linn. Tubers sent by Dr. Suckley from Steilacoom, said to be of this plant, are eaten by the Indians, under the name of "Wappatoo."
- CALYPSO BOREALIS, Salisb. (T.) Common in dark, damp fir forests, on Whidby's island; April 5.
- PLATANThERA LEUCOSTACHYS, Lindl. (G.) Common in moist prairie near Steilacoom; June. Flowers white, 4 feet high. (S.)
- P. HYPERBOREA, Lindl. Steilacoom, not common; June, 2 feet high.
- SPIRANTHES CERNUA, Rich. (G.) Common in prairies everywhere; July to October. *S. decipiens*, Hook, (G.) (Steilacoom, S.)
- SISYRINCHIUM ANCEPS, Linn., (G.) Abundant in prairies.
- S. GRANDIFLORUM, Dougl. (T.) Rare. Straits of Fuca, March 18, one specimen; flower rich purple; 1 foot high.
- TRILLIUM GRANDIFLORUM, Salisb. (G.) Forests in damp shade, everywhere; August 1.
- T. OVATUM, Pursh. (G.) (Steilacoom, S.) "Root used as a poultice." (G.)

SMILACINA RACEMOSA, Desf. (T.) Common in wet woods; May. "The berries are sometimes eaten." (G.)

S. BIFOLIA, Ker. *var.* TRIFOLIA, (G.) Common in woods, mostly along coast; May 15.

LILIUM CANADENSE, Linn. (G.) Prairies of interior, June and July; 5 feet high. Flowers smaller, leaves broader than common. (Steilacoom, G.) "Root edible." (G.)

ERYTHRONIUM GRANDIFLORUM, Pursh. Prairies of interior, March 18. Common.

FRITILLARIA LANCEOLATA, Pursh. With preceding. Whidby's island, April 18. "Root edible." (G.)

PROSARTES MENZIESII, Hook. (G.) Spruce forests along coast; May. Common.

P. HOOKERII, Torr. (T.) *P. lanuginosa*, β . *major*, Hook. Prairie, Whidby's island, in shade, rare; April 12.

STREPTOPUS AMPLEXIFOLIUS, DC. (G.) Common in spruce forests; May. (Steilacoom, S.)

ANTICLEA DOUGLASSII, Torr. (T.) (*In Whipple's Rept. P. R. R. Vol. IV.*) Prairie at Steilacoom; June. Rare.

A. NUTTALLII, Torr. (T.) Prairie on Whidby's island; April. Rare.

VERATRUM ESCHSCHOLTZII, Torr. *V. viride*, *var.*? Woods near Vancouver, June; 6 feet. Flowers white.

HESPEROSCORDERON HYACINTHINUM, Lindl. (T.) White. Prairies at Steilacoom; June. Common; 3 feet high. "Root edible." (G.)

DICHELOSTEMMA CONGESTUM, Kunth. (G.) With the preceding. Common; June. 2 feet, purple. (S.) "Poison Camass;" Bah-kah of Nisquallies. (G.)

BRODIEA GRANDIFLORA, Smith, (G.) Rare, on prairie near Puget Sound; June. Purple, (S.) "Root edible." (G.)

CAMASSIA ESCULENTA, Lindl. (T.) "Camass." Common on prairies everywhere; March 15. Blue.

LUZULA PARVIFLORA, Desvaux, (G.) Dry hills, common; 3 feet high.

L. CAMPESTRIS, *var.* Desv. (T.) Wet meadows, June; 1 foot high.

JUNCUS BALTICUS, Willd. (G.)

J. BUFONIUS, Linn. (G.) Together about salt marshes; July.

ELEOCHARIS PALUSTRIS, *var.*? (E. SCABRA, R. Brown.) "Without perigynous bristles." (T.) Marshes.

SCIRPUS LACUSTRIS, Linn. (G.) Common in marshes along coast. "Tule."

S. MARITIMUS, Linn. (G.) With the preceding.

ERIOPHORUM VAGINATUM, Linn. (*Chamissonis*,? Meyer.) Rare in cranberry marshes.

CAREX BROMOIDES, Schkur. (G.) On dry hills along coast; not common.

C. SCOULERI, Torr. (G.) Common in wet grounds, April and May; 2 feet.

C. SITCHENSIS, Bongard, (G.) Abundant in salt marshes, July; 3 feet.

C. MACROCEPHALA, Willd. (G.) Sandy prairies of sea-shore, common; May. 1 foot.

C. TERETIUSCULA, Good. "or very near it; spike shorter." (T.)

ALOPECURUS GENICULATUS, Linn. (T.) Wet ground at Steilacoom; June. Introduced.?

A. ARISTULATUS,? Michx. "between the two;" (T.) With the preceding.

KOELERIA CRISTATA, Persoon, (T.) Dry prairies; June.

POA BOREALIS, Hook. (G.) Dry hills on coast; June.

P. ANNUA, Linn. (T.) Prairies. Introduced.?

HORDEUM PRATENSE, Kunth. (G.) With preceding.

- AIRA ELONGATA, Hook. (G.) Damp prairies and salt meadows, where it is the common grass.
 A. LATIFOLIA, Hook. (G.) With preceding, but less common.
 FESTUCA MYURUS, Linn. (G.) Steilacoom. (S.)
 PANICUM. Uncertain species. (T.) Steilacoom.
 CERATOCHLOA BREVIARISTATA, Hook. (T.) Dry prairie at Steilacoom; June. Common.
 CERATOCHLOA GRANDIFLORA, Hook. (T.) Salt meadows; 3 feet high. Common.
 LOLIUM TEMULENTUM, (T.) "Near L. MULTIFLORUM." Near summit of Cape Disappointment.
 POLYPOGON. "New species.?" (T.)
 ELYMUS ARENARIUS, Linn. (G.) Sandy sea-shore prairies, 6 feet; July. (Steilacoom, S.)
 CALAMAGROSTIS STRICTA, Nutt. (G.) With the last; 2 feet high; July.
 EQUISETUM FLUVIATILE, Linn. Damp woods, common.—(S.)
 PTERIS AQUILINA, Linn. (G.) Abundant on prairies everywhere. (Steilacoom, S.)
 POLYPODIUM VULGARE, Linn. (G.) *var. occidentale*. *P. falcatum*, Kellogg, in Proc. Cal. Acad. Sciences. Among moss or wet rocks, and dead trunks.
 ADIANTUM PEDATUM, Linn. (G.) Not rare; in shady, damp woods. (S.)
 ASPIDIUM SPINULOSUM, Willd. "ex. Hooker." (G.) Woods; 4–6 feet high.
 A. MUNITUM, Kunth. (G.) Woods, common; forming dense tufts 3 or 4 feet high and wide.
 BLECHNUM BOREALE, Swartz. (G.) Spruce forest at coast, not rare; 2 feet high.
 MARCHANTIA POLYMORPHA, (*Hepaticæ*,) Linn. (Steilacoom, S.)

I have received the following letter from Mr. Samuel Ashmead, relative to two interesting marine plants, which were submitted to him for examination:

ACADEMY OF NATURAL SCIENCES,
 Philadelphia, April 20, 1857.

DEAR SIR: I received the two specimens of marine Algæ from Washington Territory, and as they do not decompose in fresh water, I transferred them to new papers and marked the names thereon.

PHYLLOSPORA MENZIESII, Ag. This plant was first discovered by Mr. Menzies in the deep waters of Nootka Sound, where it sometimes grows to an enormous length. The specimen you send is much injured by transportation; hundreds of the marginal leaves were broken off. It is a fertile specimen having "receptacles," which renders it very interesting. You will find it accurately described by Harvey in his Nereis Bor. Am. p. 62, vol. 3 or 5, Smithsonian Contributions to Knowledge. Collected in Puget Sound, by Dr. G. Suckley, U. S. A.

CALLOPHYLLIS LACINIATA, Kutz. This plant is exceedingly rare on the American coast; the species is subject to considerable variety of form, but it is easily recognized under the microscope, by the peculiar internal structure of the frond. You will find it also described by Harvey, Nereis Bor. Am. p. 171, vol. 3 or 5, Smithsonian Contributions to Knowledge. Collected at Shoalwater bay, by Captain C. J. W. Russell.

As I had not before seen either of these species, I am much pleased to be able to add them to my collection.

Very truly, yours, &c.,

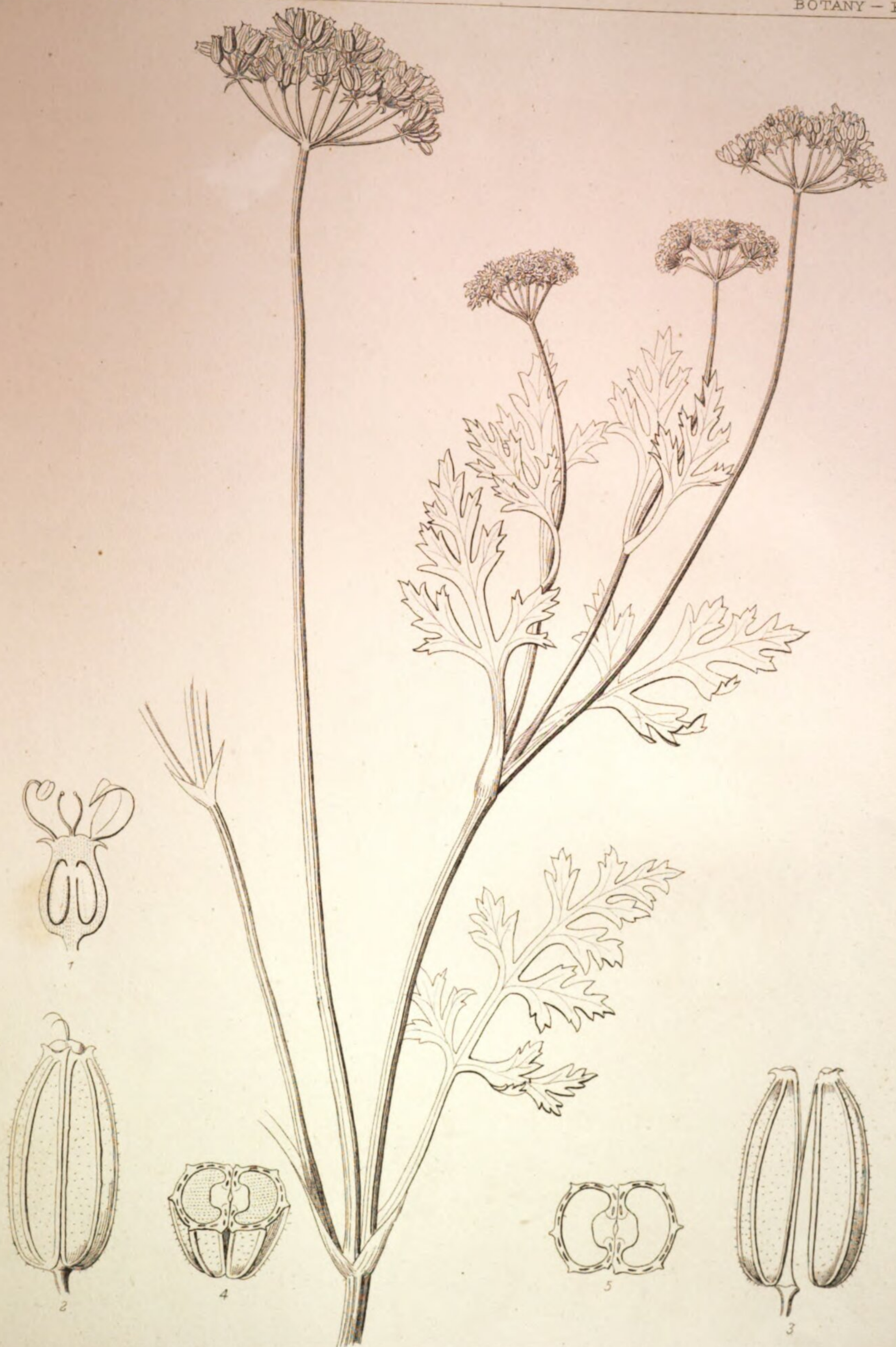
SAMUEL ASHMEAD.

Doctor COOPER.



ASTRAGALUS FILIFOLIUS

ASTRAGALUS BISULCATUS



MUSENIUM DIVARICATUM

Hervey & Bensch. Lith. Phila.



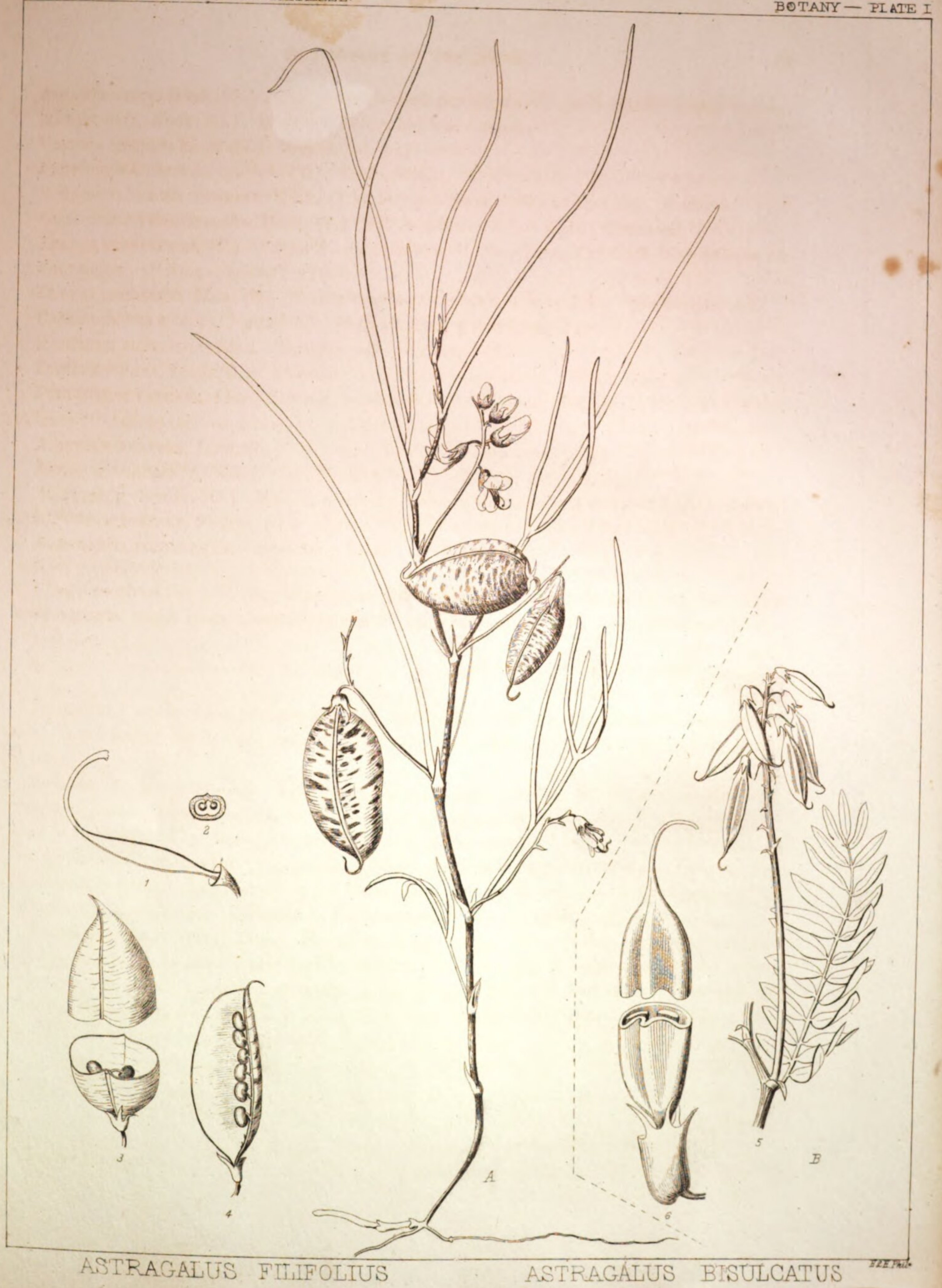
ENDOLEPIS SUCKLEYI

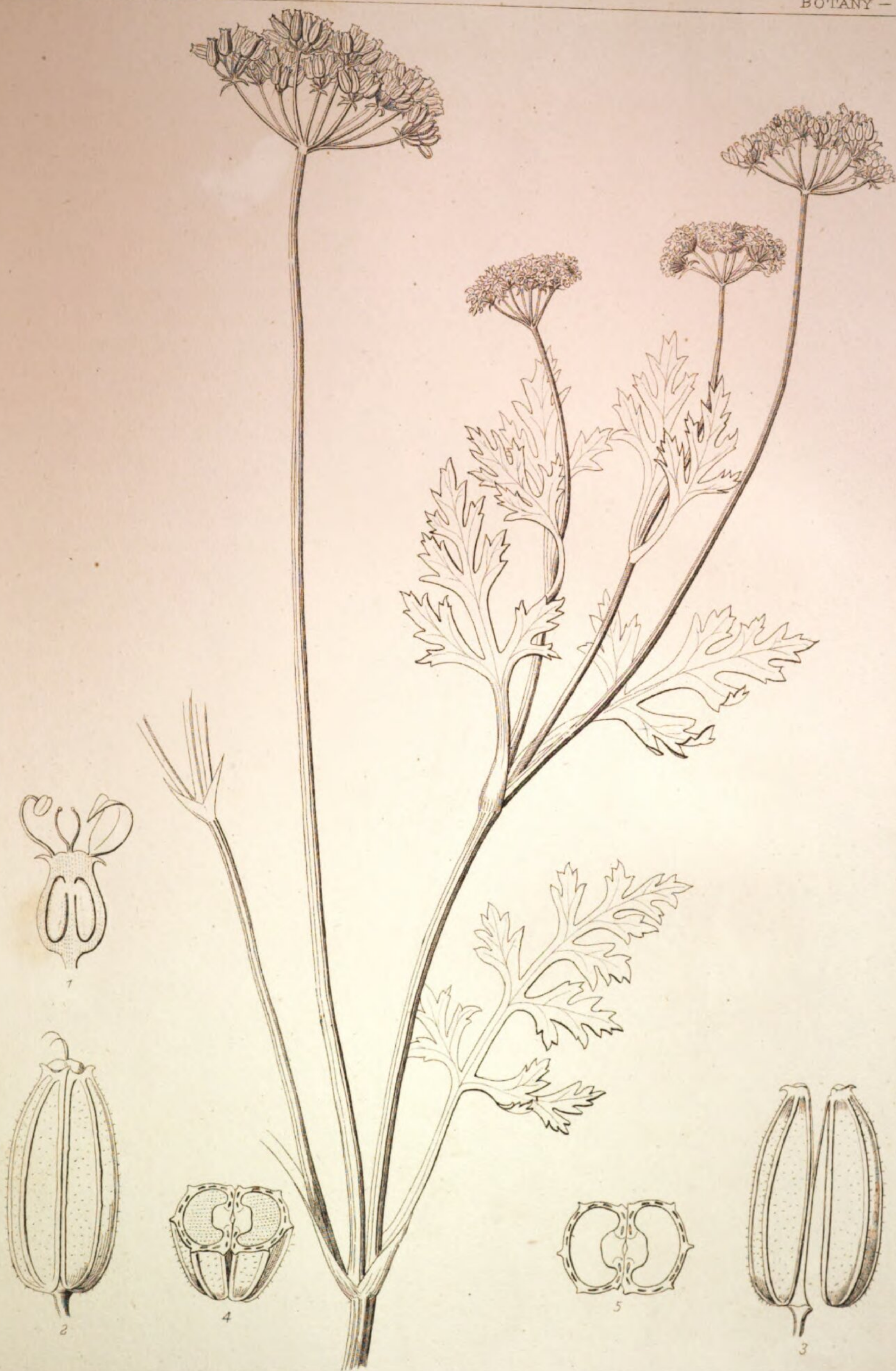
Harline & Howell, Lith. Philad.



OBIONE SUCKLEYANA.

Herline & Hensel, Lith. Phila.





MUSENIUM DIVARICATUM

Herline & Zenzel, Lith. Phila.



ENDOLEPIS SUCKLEYI



OBIONE SUCKLEYANA.

Herline & Hensel, Lith. Phila.



ASTRAGALUS (HOMALOBUS) SEROTINUS.

Herline & Hensel, Lith. Phila.



OROBUS LITTORALIS

Horn & Hensel, Lith. Phil.

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No. 1.

REPORT UPON INSECTS COLLECTED ON THE SURVEY.

BY JOHN T. LECONTE, M.D.

INTRODUCTORY REMARKS.

As early as the year 1829, many Coleoptera of the western coast of North America were made known by Eschscholtz, in his Zoological Atlas. This work was intended to contain descriptions of the copious scientific treasures collected by him during the voyages of Captain Kotzebue, of the Imperial Russian navy, during the years 1823-'26, and the results of the expedition, as well as the promptness with which they were made known, afford a lasting monument of the liberal policy pursued by the Russian government in the encouragement of intellectual pursuits, which, though not immediately connected with physical prosperity, are yet an unfailing standard of mental elevation.

The death of Eschscholtz unfortunately prevented the completion of the work; and from want of opportunity, his collections remained undescribed for several years. In the meantime, in 1843, Mannerheim published a Coleopterous fauna of California and Russian America, which contained descriptions of three hundred species. This was followed, at intervals, by three supplements, devoted to the Coleoptera of Russian America; and by the last of these, published in 1853, the total number of species known from that part of the continent was brought up to 540 species; and by his labors, that portion of the fauna has indeed been more completely developed than that of any other part of this continent. Papers by Motschulsky, also published, like those of Mannerheim, in the Bulletin of the Imperial Society of Naturalists of Moscow, contain valuable additions to the entomology of Pacific North America.

Our knowledge of the Coleoptera of Oregon and Washington Territories is still less complete, and with the exception of a few species collected by Dr. J. K. Townsend, and described by Harris, Erichson, Germar, and Reiche, consists of new material obtained almost entirely through the influence of the enterprising and zealous naturalists, Drs. Cooper and Suckley, of the present expedition. To George Gibbs, esq., of Steilacoom, I am deeply indebted for a beautiful collection, which, through the kindness of Dr. Suckley, arrived in time to be incorporated in the report. To Colonel George A. McCall, late Inspector General U. S. A., I owe my warmest acknowledgments for a valuable series collected by him while performing his official duties in Oregon.

Many years ago I examined the collection of Coleoptera made by Dr. Pickering and Mr. Titian Peale, during the expedition of the Peacock and Vincennes, under Captain Charles Wilkes, U. S. N. Among them were a considerable proportion of species found in Oregon and California, which at that time were new. The report has not been published; but on looking over the notes made at the time by me, I find that there are in the collection very few species that have not since been obtained from other sources, and which are, therefore, comprised in the catalogue here given.

Nearly one half of the species found in Russian America have become known to me by the kind exertions of my scientific friends, Baron Chaudoir and Colonel Motschulsky; and to the latter I am indebted for his careful comparison of a set of the Californian Coleoptera collected by me, with the original types of Eschscholtz, Mannerheim, and Ménétriés, by which I have been enabled greatly to increase the accuracy of my investigations.

The species which remain unknown to me are marked in the catalogue with an inverted comma before the locality, to show that they are placed in the catalogue on the authority of other writers.

The materials present, for actual investigation, in compiling this report, are therefore:

1. A series of more than two hundred species from Russian America, examined and named by Count Mannerheim, sent me by Baron Chaudoir.
2. A smaller series, containing similar species, together with some Californian types of Eschscholtz, sent me by Colonel Motschulsky.
3. About fifty species collected by the late J. K. Townsend, M. D., in Oregon, and given me by Mr. Edwin Willcox.
4. A collection made at Fort Vancouver, by Colonel McCall.
5. The collections of Dr. Cooper, made in various parts of Oregon, but chiefly at Vancouver and Shoalwater bay.
6. The collections of Dr. Suckley, made principally at Steilacoom.
7. A collection made by George Gibbs, esq., at Steilacoom.
8. The collections made by myself, at San Francisco and San Jose.
9. Two collections made in the valley of the Sacramento by Mr. J. Wittick, and presented to me by S. S. Rathvon, esq., of Lancaster, Pennsylvania.
10. Two collections made, the one in the Sacramento valley, the other at San Francisco, by Mr. J. Child, also given me by Mr. Rathvon.
11. A small but valuable collection from the vicinity of San Francisco, given me by Mr. J. P. Wild, of Baltimore.

The Staphylinidae are represented in the catalogue by species previously described; the new species collected by me are so numerous, and frequently so closely allied to species of the Atlantic slope of the continent, which are also undescribed, that it appears to me of no advantage to science to make them known separately, but rather to await the opportunity of time to place them in a general synopsis of the Staphylinidae of the United States by genera and tribes. I have, however, made use of them in constructing the tables of distribution of genera, numbered I and II.

Several Curculionidae in my collection have not been described, for the reason that, with the arrangement given by Schönherr in his '*Genera et Species Curculionidum*,' I am quite unable to refer them to appropriate genera, while the specific characters do not appear sufficiently remarkable to render them easily identified.

The collections of Drs. Cooper and Suckley, as made during the survey of the 47th parallel, were placed in my hands for examination by the Smithsonian Institution, to which I am also under great obligations, for the opportunity of examining many other North American insects.

The distribution of species in the northern part of the region which furnishes the materials for this report, presents no remarkable phenomenon. As in other northern lands, certain tribes like Adephaga, Staphylinidae, and Elateridae assume a greater preponderance in the fauna, from the fading out of the groups more characteristic of warmer climates, while a greater

number of species are found common to both continents. Of these latter, about one half are found on the Atlantic slope of America, while the other half have not yet occurred there.

The number of species occurring on both sides of America is also largely increased in these northern regions, but with the exception of *Epiphanis cornutus* and *Priognathus monilicornis*, the genera of such species are distributed on both continents.

On proceeding southwards to Oregon (and Washington Territory, which is, for purposes of convenience, always included when Oregon is referred to in these pages) similar phenomena may be observed, though on a diminished scale. The species of the eastern continent, not found on the Atlantic slope of America, have entirely vanished, and of the species common to both sides of both continents, but four remain. The number of species common to the Atlantic and Pacific slopes of America has greatly diminished, and among them *Haplochile pygmaea*, *Ligyris gibbosus*, *Alaus myops*, and *Microrhopala vittata* are the only representatives of American genera.

Finally reaching California, the species common to the two continents are reduced to *Silpha lapponica* and *Dermestes vulpinus*, the species common to Atlantic and Pacific America have not diminished absolutely in number, but from the more complete and copious fauna known to us their relative proportion is much lessened. Among them, however, are found but few which extend their range to the Atlantic States proper, while the greater proportion are not found east of Kansas. Of American genera, *Amblychila cylindriciformis*, *Lachnophorus elegantulus*, and *Eurymetopon atrum* are found in Kansas, or New Mexico, while *Ligyris gibbosus* and two species of *Diabrotica* also extend to the Atlantic.

Having thus passed in rapid review the distribution of species, as illustrated by tables III and IV, the much more important subject of the distribution of genera remains to be considered. The phenomena afforded by the study of seven of the most numerous families, I have endeavored to express in a numerical form in tables I and II.

In Russian America the genera seem to follow to a certain extent the course already pointed out of the species, that is: the genera common to both continents have a much greater relative proportion, and among them a by no means insignificant part have not yet been found in Atlantic America; but as some of them are characteristic of high northern latitudes, there is reason to believe that the number will be reduced by more thorough explorations in Labrador, Newfoundland, and the regions near Hudson's Bay.

Of genera confined to America, but six or seven occur in Russian America; of these but three, *Pristodactyla*, *Epiphanis*, and *Priognathus*, have been detected on the Atlantic slope. *Pristodactyla* might, indeed, be for the present excluded from the list of peculiar American genera, for two reasons: 1, a certain number of species classed by Dejean, with *Agonum*, and remarkable for having but two dorsal punctures, are in reality *Pristodactylae*, and until the species of Siberia are thoroughly revised, we are warranted in supposing that some of them may also be included; but, 2, because the distinctions between *Calathus* and *Pristodactyla*, as observed by Lacordaire, are hardly sufficient to warrant the retention of the latter genus.

In Oregon the eastern genera, not found in the Atlantic States, have diminished in number, but among them occurs *Callisthenes*, which is found in Kansas. The number of American genera has largely increased, even with our limited collections; of them 14 are found in the Atlantic States, 2 in Kansas, while 8 are peculiar to Pacific America; of the 14 found in the Atlantic States, *Haplochile*, *Dichelonychia*, *Anelastes*, and *Alaus* are the only ones not found within the tropics.

In California the genera of the eastern continent have increased absolutely, from more extensive collections, over those found in Oregon, but do not attain the same relative proportion as those found in Russian America; among them is one, *Tryssus*, a genus heretofore known only from Madagascar, and is thus far the sole representative of the tribe of Scarabaeidae, to which it belongs on this continent.

The number of American genera has greatly increased, partly by the addition of genera found within the tropics, and partly by the introduction of a few peculiar genera; the most remarkable addition, however, is that of eighteen genera of Tenebrionidae, of which but two, *Nosoderma* and *Blapstinus*, extend into the Atlantic States, while only four others extend into Kansas or New Mexico. The genera found in the Atlantic States, and not in the tropics, are *Thalpius*, *Axinopalpus*, *Dichelonycha*, *Anelastes*, *Perothops*, and *Melanactes*.

Another fact of great interest is the distribution of species within narrow limits observed in California. I am not able to exhibit the results in a tabular form, as collections have not been made with minuteness at a sufficient number of localities to give any definite results, but I can merely state my own experience, that but few species occurred at more than one place, and call attention to the fact that, in every collection made at a fresh locality, a large proportion of new species is found, while in Oregon, at points equally distant from each other, a greater uniformity is seen.

The analysis, therefore, conducts to the same results announced by me, in 1851, at the meeting of the American Association for the Advancement of Science; the fourth proposition was, unfortunately, announced in too absolute terms, as the only two genera then known to me, *Thalpius* and *Axinopalpus*, were not considered as of sufficient importance to modify the result. *Thalpius*, indeed, is so closely allied to *Diaphorus*, that we may well expect some of the species of the latter genus to belong to it, while *Axinopalpus* is by many entomologists not separated from *Dromius*. The other four American genera common to California and Atlantic America, not found in the tropics—*Dichelonycha*, *Anelastes*, *Perothops*, and *Melanactes*—upon which I am now obliged to modify the assertion, were subsequently obtained.

The four propositions stated by me in the essay mentioned are:

1. California constitutes a peculiar zoological district, with sufficient relation to the other districts of America to prove that it belongs to the same continental system.
2. This zoological district is divided into several sharply defined sub-districts, having a very close resemblance to each other.

As the same mode of distribution obtains in the groups of islands adjacent to the western coast of America, we are led to believe—

3. That the local distribution of a small number of species is the characteristic of the eastern Pacific region, as the extensive distribution of a large number is the prevailing feature of the Atlantic basin.

4. The genera occurring in, but not peculiar to, this district belong to two classes: either (with the exception of *Ergates*) they occur on the Atlantic slope of both continents, or, if peculiar to America, they are (with the few exceptions above noted) also found within the tropics.

[NOTE.—The Coleoptera collected by me at San Diego and other localities in the southern part of California have not been included in this report, as they more properly belong to the fauna of the Mexican Boundary, and will be contained in the report of the survey made by the Boundary Commission.]

TABLE I.—Genera common to the Eastern and Western Continents.

Names of families.	Total number of Genera.	Russian America.		Oregon.		California.	
		In Atlantic States.		In Atlantic States.		In Atlantic States.	
Adephaga	46	27	4	25	2	35 + 2? ¹	1
Silphales	11	8	3	2	1	3	1
Staphylinidae	42	25	5	Not collec.	-----	30	-----
Scarabaeidae	9	2	-----	4	-----	7 + 1 ²	1
Elateridae	9	5	-----	9	-----	7	-----
Tenebrionidae	6	1	-----	3	-----	4	1
Cerambycidae	17	11	1	13	2	10	2
Chrysomelidae	16	6	-----	10	1	13	1

¹ Calleida, Patrobus.² Sinodendron : a species from the Atlantic States, is described by Beauvois.

The genera of the above table, which have not been found in the Atlantic States, are :

In Russian America.—Miscodera, Leistus, Pelophila, Trachypachys, Necrophilus, Sphaerites, Lyrosoma, Bolitochara, Syntomium, Phloeonaeus, Arpedium, Deliphrum, Rosalia.

In Oregon.—Callisthenes, Trachypachys, Necrophilus, Ergates, Rosalia, Timarcha.

In California.—Anillus, Necrophilus, Tryssus, Calcar, Ergates, Mesosa, Timarcha.

TABLE II.—Genera peculiar to America.

Names of families.	Total number of Genera.	Russian America.			Oregon.			California.		
		In Atlantic States.	Not in Atlantic States.		In Atlantic States.	Not in Atlantic States.		In Atlantic States.	Not in Atlantic States.	
			A.	B.		A.	B.		A.	B.
Adephaga	18	1	-----	-----	2	-----	3	6 + 1?	1	7
Staphylinidae	2	-----	-----	1 + 1?	Not col.	Not col.	-----	-----	-----	1
Scarabaeidae	7	-----	-----	-----	4	-----	-----	6	-----	1
Elateridae	8	1	-----	-----	3	-----	-----	4	-----	1
Tenebrionidae	19	-----	-----	1	2	2	1	2	4 ³	12
Cerambycidae	6	-----	-----	2	1	-----	4	1	-----	1? ⁴
Chrysomelidae	4	-----	-----	-----	2	-----	-----	4	-----	-----

³ Triorophus, Eurymetopon, Eleodes, Coniontis.⁴ Oenemona?

The columns headed A contain genera found in the central desert regions of Kansas, New Mexico, and Texas, although not extending into the Atlantic region proper. Those headed B, therefore, contain the genera peculiar to the Pacific slope.

The genera of the above table which are found in the Atlantic States, are :

In Russian America.—Pristodactyla, Epiphanis.

In Oregon.—Anisodactylus, Haplochile, Ligyrus, Diplotaxis, Dichelonycha, Canthon, Anelastes, Alaus, Asaphes, Nosoderma, Blapstinus, Tetraopes, Saxinis, Microrhopala.

In California.—Diaphorus, Thalpius, Lachnophorus, Casnonia, Axinopalpus, Anisodactylus, Pasimachus? Ligyrus, Cremas-tochilus, Diplotaxis, Dichelonycha, Camptorhina, Canthon, Anelastes, Perothops, Monocrepidius, Melanactes, Nosoderma, Blapstinus, Tetraopes, Chlamys, Saxinis, Diabrotica, Microrhopala.

TABLE III.—*Species common to the Atlantic and Pacific slopes of the continent.*

NOTE.—The species are divided into three sets, according to locality; those which are found in two of the sets are noted by the number corresponding to the number of the set in which they occur. Species found in the interior regions—Kansas, New Mexico, and Upper Texas—are noted with a (C.) Those found in Europe, (E.)

1. <i>Species found in Russian America.</i>		
Platynus octocolus.	Hydnobius punctostriatus.	Xyloterus bevittatus.
Platynus bembidioides.	Aleochara bimaculata, 3.	Bostrichus septentrionis.
Pterostichus orinomum, (E.) 2.	Philonthus aterrimus, (E.)	Tetropium cinnamopterum.
Amara impuncticollis.	Quedius molochinus, (E.)	Semanotus Proteus.
Ochthedromus bimaculatus.	Ips Dejeanii.	Leptura vexatrix.
Elaphrus californicus, 3.	Dermestes vulpinus, (E.) 2, 3.	Leptura liturata.
Laccophilus truncatus, (C.)	Byrrhus cyclophorus.	Monohammus scutellatus, 2.
Hydroporus griseostriatus, (E.)	Chrysobothris trinervia, 2.	Eumolpus vitis, (E.)
Agabus phaeopterus.	Epiphanis cornutus.	Hippodamia 13-punctata, (E.) 2.
Agabus bicolor.	Clerus undulatus.	Hippodamia parenthesis.
Agabus semipunctatus.	Priognathus monilicornis.	Coccinella 12-maculata, (E.)
Ilybius picipes, 2.	Lepidophorus lineaticollis.	Coccinella trifasciata, (E.)
Dytiscus confluens.	Lepyrus gemellus.	Coccinella transversoguttata, (E.)
Dytiscus anxius, 2, 3.	Hylurgus rufipennis.	
Silpha lapponica, (E.) 2, 3.	Hylesinus rufipennis.	
2. <i>Species found in Oregon.</i>		
Cicindela vulgaris.	Ligyris gibbosus.	Rhyncites bicolor, 3.
Pterostichus orinomum, (E.) 1.	Polyphylla 10-lineata, (C.) 3.	Tetropium cinnamopterum.
Chlaenius sericeus.	Ancylochira rusticorum, 3.	Clytus undulatus.
Haplochile pygmaea.	Chrysobothris femorata?	Monohammus scutellatus, 1.
Calosoma calidum.	Chrysobothris trinervia, 1.	Chrysomela scripta.
Laccophilus truncatus, (C.) 1, 3.	Elater phoenicopterus.	Chrysomela Bigsbyana.
Dytiscus anxius, (C.) 1, 3.	Adelocera aurorata.	Galleruca canadensis.
Silpha lapponica, (E.) 1, 3.	Alaus myops.	Microrhopala vittata.
Silpha ramosa, (C.) 3.	Ellychnia corrusca?	Anisosticta vittigera, (C.) 3.
Saprinus lugens, (C.) 3.	Trichodes ornatus, (C.) 3.	Coccinella trifasciata, (E.)
Saprinus oregonensis, (C.) 3.	Clerus sphegeus, (C.) 3.	Hippodamia 13-punctata, (E.)
Nitidula ziczac.	Serropalpus substriatus.	
3. <i>Species found in California.</i>		
Amblychila cylindriciformis, (C.)	Silpha ramosa, (C.) 2.	Eurymetopon atrum, (C.)
Lachnophorus elegantulus, (C.)	Staphylinus villosus.	Cistela sericea?
Elaphrus californicus.	Hister immunis.	Mordella scutellaris.
Hydroporus striatellus, (C.)	Saprinus lugens, (C.) 2.	Rhyncites bicolor, 2.
Hydroporus parallelus, (C.)	Saprinus oregonensis, (C.) 2.	Centrinus confusus?
Hydroporus vilis, (C.)	Phalacrus penicellatus, (C.)	Tetropium cinnamopterum, 1, 2.
Laccophilus truncatus, (C.) 1, 2.	Dermestes vulpinus, (E.) 1, 2.	Diabrotica 12-punctata.
Dytiscus anxius, (C.) 1, 2.	Ligyris gibbosus, 2.	Diabrotica vittata.
Hydrophilus triangularis.	Polyphylla 10-lineata, (C.) 2.	Anisosticta vittigera, (C.) 2.
Philhydrus diffusus, (C.)	Ancylochira rusticorum, 2.	Coccinella abdominalis.
Necrophorus marginatus.	Trichodes ornatus, (C.) 2.	
Silpha lapponica, (E.) 1, 2.	Clerus sphegeus, (C.) 2.	

TABLE IV.—*Species found in Russian America and in the eastern continent, not introduced and not found in Atlantic America.*

Platynus Bogemanni.	Olisthaerus megacephalus.	Dinoderus substriatus.
Carabus viettinghovii.	Elater nigrinus.	Serropalpus striatus.
Colymbetes dolabratus.	Corymbites confluens.	Chrysomela lapponica.
Necrophorus mortuorum.	Helodes variabilis?	Chrysomela viminalis.

LIST OF SPECIES.

CICINDELIDAE.

OMUS Esch.

- californicus Esch., (infra).....Cal.
 Audouini Reiche, (infra).....Or.
 Dejeanii Reiche, (infra).....Or.

AMBLYCHILA Say.

- cylindriformis Say.'Cal.
Piccolomini Reiche.

CICINDELA Linn.

- vulgaris Say, (var. viridis).....Or.
obliquata Dej.
 oregona Lec.Or. Cal.
 n. sp., indetermin.Or.
 californica Ménét.'Cal.
 ? *tenuisignata* Lec.

CARABIDAE.

BRACHINUS Weber.

- Tschernikhii Mann.Cal.

GALERITA Fabr.

- californica Mann.Cal.

DIAPHORUS Dej.

- tenuicollis Lec.Cal.

THALPIUS Lec.

- rufulus Lec., Trans. Am. Phil. Soc., x, 373.Cal.
Enaphorus rufulus Lec.

LACHNOPHORUS Dej.

- elegantulus Mann.Cal.
Tachypus mediosignatus Mén.

CASNONIA Latr.

- picta Chaud.'Cal.

LEBIA Latr.

- cyanipennis Dej.Cal.
 cyanella Lec.Cal.
Lamprias cyanellus Motsch. Car. Russl., 42.

METABLETUS Schmidt.

- nigrinus Lec.Cal.
Dromius nigrinus Mann.
Bomius nigrinus Lec.

AXINOPALPU Lec.

- fusciceps Lec.Cal.

- californicus Lec.Cal.

Dromius californicus Motsch.

CALLEIDA Dej.

- croceicollis Ménét.'Cal.
 var. *Calleida chloridipennis* Motsch., Car. Russl. 39.
 ? *Philotecnus ruficollis* Lec.

PHILOTECNUS Lec.

- ruficollis Lec.Cal.
 nigricollis Lec.Cal.
 ? *Calleida cyanea* Motsch. Car. Russl., 39.

CYMINDIS Latr.

- viridis Dej., Sp. Gen. 5,325, Mann. Bull. Mosc. 1843, 183.'Cal.

TRECHUS Clairv.

- spectabilis Mann. Bull. Mosc. 1852.'R.
 chalybeus Dej.R.
 oblongulus Mann.'R.
 ovipennis Motsch.R. Cal.
 californicus Motsch.R.

TACHYS Lec.

- rivularis Motsch., Mann. Bull. Mosc. 1853.'R.

CALATHUS Bon.

- ruficollis Dej.Cal.
 Berensii Mann.'Cal.
 quadricollis Lec. Proc. Acad. Nat. Sc. vii, 37Cal.
 ingratus Dej.R.
 incommodus Mann.R.
Vix a praeced. differt.

PRISTODACTYLA Dej.

- lenis Lec.R.
Anchomenus lenis Mann. Bull. Mosc. 1853.
 mollis Lec.R.
Agonum molle Dej.
 ? *dulcis* Mann. (Anchomenus) B. M. 1853.'R.

PLATYNUS Bon. (emend. Brullé.)

- cinctellus Lec. Proc. Acad. Nat. Sc. 7, 37Cal.
 maurus Motsch. (Anchomenus)'Cal.
 ovipennis Mann. (Anchomenus)'Cal.
Anchomenus rotundipennis Motsch.
 rugiceps Mann. (Anchomenus)'Cal.
Anchomenus ovipennis Motsch.
 brunneomarginatus Mann. (Anchom.)'Cal.
 micans Lec.Cal.

- Anchomenus micans* Mén.
Scaphiodactylus micans Chaud.
neolus Lec. Proc. Acad. Nat. Sc. 7, 45 Or.
californicus Lec. Proc. Acad. Nat. Sc. 7, 47 Cal.
Anchomenus californicus Dej.
ferruginosus Dej. (*Anchomenus*) 'Cal.
frater Lec. Proc. Acad. Nat. Sc. 7, 49 Cal.
quadratus Lec. *ibid.* 7, 50 Or.
maculicollis Lec. Cal.
Agonum maculicollis Dej.
Anchomenus maculicollis Mann.
variatus Lec. Proc. Acad. Nat. Sc. 7, 56 Cal.
Agonum limbatum || Motsch.
deplanatus Lec. Cal.
Agonum deplanatum Mén.
brevicollis Dej. (*Agonum*) 'Cal.
fossiger Lec. Cal. Or.
Agonum fossiger Dej.
Anchomenus fossiger Mann.
famelicus Ménétr. (*Agonum*) 'Cal.
strigicollis Lec. R. Or.
Anchomenus strigicollis Mann.
Bogemanni 'R.
Harpalus Bogemanni Gyll.
Agonum Bogemanni Dej.
Anchomenus Bogemanni Mann. Bull. Mosc. 1853.
octocolus Mann. (*Anchom.*) B. Mosc. 1853 'R.
? *Playtinus stigmatus* Lec. Proc. Acad. 7, 58.
bembidioides Lec. Proc. Acad. 7, 57 'R.
Sericoda bembidioides Kirby.
Anchomenus bembidioides Mann. Bull. Mosc. 1853.
gratiosus Mann. (*Anchomenus*) *ibid.* 1853 'R.
fragilis Mann. (*Anchom.*) *ibid.* 1853 'R.
exaratus Mann. (*Anchom.*) *ibid.* 1853 'R.
striatus Dej. (*Anchom.*) 'Cal.
sulcatus Dej. (*Anchom.*) 'Cal.
- PTEROSTICHUS Bon. (emend. Er.)
contractus Lec. Journ. Acad. Nat. Sc. 2nd ser. 2, 237 Cal.
congestus Mén. (*Feronia*) 'Cal.
castanipes Mén. (*Feronia*) 'Cal.
Menetriesi Motsch. (*Brachystylus*) 'Cal.
Brachystylus megas Chaud.
Pterostichus ater ‡ Mén.
herculeus Mann. 'R.
validus Mann. R.
Feronia valida Dej.
vicinus Mann. Cal.
Pterostichus californicus ‡ Lec. (fide Chaudoir)
muticus Lec. Cal.
californicus Mann. Cal.
Feronia californica Dej.
Pterostichus simplex Lec.
planctus Lec. Journ. Acad. 2nd ser. 2, 239 Or. Cal.
algidus Lec. *ibid.* 2, 239 Or.
amethystinus Mann. R. Or.
castaneus Mann. R.
Feronia castanea Dej.
brunneus Mann.
Feronia brunnea Dej.
- angustus* Mann. Cal.
Feronia angusta Dej.
Pterostichus linearis Lec. (fide Chaudoir.)
longicollis Lec. Journ. Acad. 2nd ser. 2, 239 Or.
fatuus Lec. R.
Cryobius fatuus Mann. Bull. Mosc. 1853.
riparius Mann. R.
Feronia riparia Dej.
vindicatus Lec. R.
Cryobius vindicatus Mann. B. M. 1853.
hyperboreus Mann. (*Cryobius*) *ibid.* 'R.
subexaratus Mann. (*Cryobius*) *ibid.* 'R.
ventricosus Mann. R.
Poecilus ventricosus Esch.
Feronia ventricosa Dej.
pinguedineus Mann. R.
Poecilus pinguedineus Esch.
Feronia pinguedinea Dej.
empetricola Mann. R.
Feronia empetricola Dej.
subcaudatus Lec. R.
Cryobius subcaudatus Mann. B. M. 1853.
fastidiosus Lec. R.
Cryobius fastidiosus Mann. *ibid.* 1853.
rugulosus Mann. (*Cryobius*) *ibid.* 1852 'R.
similis Mann. (*Cryobius*) *ibid.* 1852 'R.
ruficollis Mann. (*Cryobius*) *ibid.* 1853 'R.
rotundicollis Mann. (*Cryobius*) *ibid.* 1853 'R.
quadrucollis Mann. (*Cryobius*) *ibid.* 1853 'R.
lustrans Lec. Journ. Acad. 2nd ser. 2, 241 Or. Cal.
linearis Mann. (*Argutor*) B. M. 1853 'R.
ruficapus Mann. (*Omaseus*) *ibid.* 1853 'R.
fusco-aeneus Mann. 'R.
Omaseus fusco-aeneus Chaud.
vitreus, Lec. R.
Feronia vitrea Dej.
orinomum Lec. R. Or.
Omaseus orinomum Kirby.
Bothriopterus orinomum Mann. B. M. 1852.
adstrictus Esch. R.
Feronia adstricta Dej.
commixtus Chaud. (*Bothriopterus*) 'R.
sempunctatus Lec. R.
Bothriopterus sempunctatus Mann.
seriepunctatus Mann. R.
- HOLCIOPHORUS Lec.
ater Lec. Journ. Acad. Nat. Sc. 2nd ser. 2, 250 Or. Cal.
Feronia atra Dej.
Pterostichus ater Mann.
Feronia lama Ménétr.
Pterostichus aterrimus Motsch.
- POECILUS Bon.
occidentalis Lec. Journ. Acad. Nat. Sc. 2nd., 2, 253 Cal.
Feronia occidentalis Dej. (fide Chaud.)
Pterostichus occidentalis Mann.
- AMARA Bon.
stipida Lec. Proc. Acad. Nat. Sc. 7, 347 Cal.
infausta Lec. *ibid.* R.

<i>Leirus rufimanus</i> || Motsch.	
<i>Leirus carinatus</i> ‡ Mann.	
<i>melanogastrica</i> Dej.	R.
<i>Eschscholtzii</i> Lec.	R.
<i>Leirus Eschscholtzii</i> Chaud.	
<i>obtusa</i> Lec. Proc. Acad. 7, 348	R.
<i>Amara Eschscholtzii</i> Mann.	
<i>oregona</i> Lec. Proc. Acad. 7, 349	Or.
<i>glacialis</i> Mann. (Bradytus) B. M. 1853	' R.
<i>scitula</i> Zimm.	Cal.
<i>longula</i> Lec. Proc. Acad. Nat. Sc. 7, 350	Cal.
<i>insignis</i> Dej.	Or. Cal.
<i>impuncticollis</i> Say, (fide Mann. B. M. 1853)	' R.
<i>littoralis</i> Mann? Lec. Proc. Acad. 7, 351	R.
<i>inepta</i> Lec. Proc. Acad. 7, 351	Or.
<i>conflata</i> Lec. ibid.	Cal.
<i>erratica</i> Sturm. (fide Mann.)	' R.
<i>Celia erratica</i> Zimm.	
<i>Amara punctulata</i> Dej.	
<i>californica</i> Dej.	Cal.
<i>remotestriata</i> Dej.	R.
<i>Celia remota</i> Zimm.	
<i>Celia reducens</i> Mann.	
<i>amplicollis</i> Mann. (Celia) Bull. Mosc. 1853	' R.
<i>indistincta</i> Mann. (Celia) ibid. 1853	' R.
<i>rectangula</i> Lec. Proc. Acad. 7, 353	Or.
<i>aurata</i> Dej.	Cal.
AGAOSOMA Ménétr.	
<i>californicum</i> Ménétr., (infra).	Cal.
<i>Stenomorphus californicus</i> Chaud.	
ANISODACTYLUS Dej.	
<i>dilatatus</i> Lec. Trans. Am. Phil. Soc. 10, 383	Cal.
<i>Harpalus dilatatus</i> Dej.	
<i>Dicheirus dilatatus</i> Mann.	
<i>brunneus</i> Dej. (Harpalus)	' Cal.
<i>obtusus</i> Lec.	Cal.
<i>Dicheirus obtusus</i> Lec.	
<i>hirsutus</i> Ménétr. (Diplocheirus)	' Cal.
<i>villosus</i> Motsch. (Dicheirus)	' Cal.
<i>irregularis</i> Motsch. (Dicheirus)	' Cal.
<i>piceus</i> Lec.	Cal.
<i>Diplocheirus piceus</i> Ménétr.	
<i>Dicheirus parallelus</i> Lec.	
<i>consobrinus</i> Lec.	Or. Cal.
<i>confusus</i> Lec.	
<i>californicus</i> Dej.	Or. Cal.
<i>similis</i> Lec.	Or.
<i>alternans</i> Lec.	Cal.
<i>amaroides</i> Lec.	Cal.
BRADYCELLUS Er.	
<i>obesulus</i> Lec. Trans. Am. Phil. Soc. 10, 385	Or.
<i>Harpalus obesulus</i> Lec. Ann. Lyc. 5, 185.	
<i>nigrinus</i> Lec.	R.
<i>Harpalus nigrinus</i> Dej.	
<i>axillaris</i> Lec.	R.
<i>Acupalpus axillaris</i> Mann. B. M. 1853.	
<i>longiusculus</i> Lec.	R.

<i>Acupalpus longiusculus</i> Mann. ibid.	
<i>conflagratus</i> Mann. (Acupalpus) ibid.	' R.
<i>nitidus</i> Mann.	Cal.
<i>Acupalpus nitidus</i> Dej.	

HARPALUS Latr.

<i>fraternus</i> Lec.	Or.
<i>fulvilabris</i> Mann.	R. Or.
<i>curtatus</i> Mann.	' R.
<i>albionicus</i> Mann.	' Cal.
<i>cautus</i> Dej.	Or. Cal.
<i>advena</i> Lec.	Or.
<i>somnolentus</i> Dej.	R.
<i>hirsutus</i> Ménétr.	' Cal.
<i>alternans</i> Motsch.	' Cal.
<i>porosus</i> Motsch. (Ophonus)	' Cal.

STENOLOPHUS Dej.

<i>limbalis</i> Lec. (infra)	Cal.
<i>anceps</i> Lec. (infra)	Cal.
<i>unicolor</i> Dej.	Cal.
<i>tener</i> Lec. (infra)	Cal.
<i>californicus</i> Lec. (infra)	Cal.
<i>symmetricus</i> Motsch. Car. Russl. 23	Cal.

BADISTER Clairv.

<i>ferrugineus</i> Dej.	' Cal.
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CHLAENIUS Bon.

<i>viridifrons</i> Esch.	' Cal.
<i>sericeus</i> Say.	Or.
<i>Carabus sericeus</i> Forster.	
<i>Chlaenius perviridis</i> Lec.	
<i>variabilipes</i> Esch.	' Cal.
<i>an C. asperulus</i> Ménétr.?	
<i>asperulus</i> Ménétr.	Cal.
<i>obscurus</i> Lec.	
<i>harpalinus</i> Esch.	Cal.
<i>pubescens</i> ‡ Mann.	' Cal.

PASIMACHUS Bon.

<i>californicus</i> Chaud.	' Cal.
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CLIVINA Latr.

<i>punctulata</i> Lec.	Cal.
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DYSCHIRIUS Bon.

<i>transmarinus</i> Mann. B. M. 1853.	' R.
<i>frigidus</i> Mann. ibid.	' R.
<i>consobrinus</i> Lec.	Cal.

HAPLOCHILE Lec.

<i>pygmaea</i> Lec.	Or.
<i>Morio pygmaeus</i> Dej.	

MISCODERA Esch.

<i>insignis</i> Mann. B. M. 1852.	' R.
<i>americana</i> Mann. B. M. 1853.	' R.

METRIUS Esch.

<i>contractus</i> Esch.	Cal.
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PROMECOGNATHUS Chaud.	
laevissimus Chaud. (infra).....	Cal.
ANILLUS Duval.	
debilis Lec. Trans. Am. Phil. Soc. 10, 397	Cal.
OCHTHEDROMUS Lec.	
indistinctus Lec.	Cal.
<i>Bembidium indistinctum</i> Mann.	
glabriusculus Mann. (Bembid.) B. M. 1853.....	' R.
nigripes Mann. ‡ (Notaphus) B. M. 1852.....	R.
undulatus Sturm. (Bembid.).....	' R.
<i>Notaphus undulatus</i> Mann. B. M. 1853.	
quadraticollis Mann. (Notaphus) ibid.	' R.
Mannerheimii Lec.	Cal.
<i>Bembidium transversale</i> ‡ Mann.	
pictus Lec.	Cal.
bimaculatus Lec.	' R.
<i>Peryphus bimaculatus</i> Kirby; Mann. B. M. 1853.	
lucidus Lec.	R.
nitens Lec.	R.
<i>Peryphus picipes</i> ‡ Mann. B. M. 1853.	
tetraglyptus Mann. (Peryphus) ibid.	' R.
complanulus Lec.	R.
<i>Peryphus complanulus</i> Mann. ibid.	
incertus Lec.	R.
<i>Notaphus incertus</i> Motsch.	
brevis Motsch. (Peryphus)	' R.
planusculus Lec.	R.
<i>Bembidium planusculum</i> Mann.	
Kuprianovii Mann. (Bembidium).....	' R.
<i>Peryphus ovipennis</i> Motsch.	
biimpressus Mann. (Bembidium)	' R.
quadrifoveolatus Mann. (Bemb.)	' R.
fortistriatus Motsch. (Omala).....	' R.
politus Motsch. (Omala).....	' Cal.
dubitans Lec.	Cal.
cruralis Lec.	Cal.
iridescens Lec.	Cal.
mundus Lec.	Cal.
<i>? Lophia bifasciata</i> Motsch. Car. Russl. 12.	
angulifer Lec.	Cal.
connivens Lec.	Cal.
concolor Motsch. (Peryphus) Car. Russl. 9	' Cal.
elongatus Mann. (Tachypus) B. M. 1853.....	' R.
PATROBUS Dej.	
fossifrons Dej.	R.
<i>Platysma fossifrons</i> Esch.	
longiventris Mann. B. M. 1853	R.
fulvus Mann. ibid.	' R.
angusticollis Mann. ibid.	' R.
foveocollis Dej.	R.
<i>Platysma foveocollis</i> Esch.	
aterrimus Dej.	R.
californicus Motsch. Mem. Acad. St. Petersb. 131, 1842	' Cal.
CYCHRUS Fabr.	
velutinus Ménér.	' Cal.
angusticollis Fischer	Or. R.
angulatus Harris	' Or.

cristatus Harris.....	' Or.
<i>? reticulatus</i> Motsch.	' R.
marginatus Dej.	Or. R.
ventricosus Dej. Esch.	Cal.
<i>striatopunctatus</i> Chaud.	
interruptus Ménér.	Cal.
<i>ventricosus</i> ‡ Chaud.	
cordatus Lec. Trans. Am. Phil. Soc. 10, 399.....	Cal.
constrictus Lec. ibid. 10, 398.....	Cal.
tuberculatus Harris (infra).....	Or.
CARABUS Linn.	
Vietinghovii Adams; Mann. B. M. 1852.....	' R.
taedatus Fabr. (infra)	Or. R.
<i>baccivorus</i> Fischer.	
<i>seriatus</i> Wiedemann.	
oregonensis Lec. Proc. Acad. 7, 16 (infra).....	Or.
Chamissonis Fischer	R.
<i>brachyderus</i> Wiedemann.	
truncaticollis Esch. Zool. Atl. 5, 22.....	R.
CALOSOMA Fabr.	
calidum ? Fabr. (infra)	Or.
tepidum Lec.	Or.
semilaeve Lec.	Cal.
cancellatum Esch. (infra)	Or. Cal.
<i>aenescens</i> Lec. Proc. Acad. 7, 16.	
discors Lec. (infra)	Cal.
CALLISTHENES Fischer.	
Zimmermanni Lec.	Or.
<i>Carabus Zimmermanni</i> Lec.	
Wilkesi Lec.	Or.
moniliatus Lec.	Or.
LEISTUS Fröhl.	
ferruginosus Mann.	R.
<i>ferrugineus</i> Esch. Dej.	
NEBRIA Latr.	
metallica Fischer	R.
Gebleri Esch. Dej.	' R.
gregaria Fischer	R.
Mannerheimii Fischer	R.
Sahlbergii Fischer	Or. R.
Rathvoni Lec. Tr. Am. Phil. Soc. 10, 400	Cal.
bifaria Mann. B. M. 1853.....	' R.
<i>carbonaria</i> ‡ Mann.	
Eschscholtzii Ménér.	Cal.
PELOPHILA Dej.	
californica Motsch. Mem. Acad. St. Petersb. 1842, 72.....	' Cal.
Eschscholtzii Mann.	R.
NOTIOPHILUS Dum.	
sylvaticus Eschsch.	R.
semiopacus Eschsch.	Cal.
nitens Lec. (infra)	Or.
TRACHYPACHYS Motsch.	
inermis Motsch. Car. Russl. 16, (infra).....	Cal. ? Or. R.
<i>Holmbergi</i> Mann. B. M. 1853.	

OPISTHIUS Kirby.

Richardsonii Kirby Or.

LORICERA Latr.

semipunctata Esch. R. Cal.
 foveata Lec. Cal.
 decempunctata Esch. R.
 congesta Mann. B. M. 1853 'R.

BLETHISA Bon.

oregonensis Lec. Trans. Am. Phil. Soc. 10, 401 Or.

ELAPHRUS Fabr.

obliteratus Mann. Bull. Mosc. 1853 'R.
 laevigatus Lec. Cal.
 californicus Mann. R. Cal.
 gratus Mann. B. M. 1853.

AMPHIZOIDAE.

AMPHIZOA Lec.

insolens Lec. (infra) Cal.

DYTISCIDAE.

CNEMIDOTUS Illiger.

callosus Lec. Cal.

HALIPLUS Latr.

pantherinus Aubé 'R.

HYDROPORUS Clairv.

obscurus Lec. Cal.
 erythrostomus Mann. B. M. 1852 R.
 striatellus Lec. Cal.
 planatus Mann. Bull. Mosc. 1853 'R.
 signatus Mann. B. M. 1853 R.
 truncatus Mann. B. M. 1853 'R.
 humeralis Aubé R.
 contractulus Mann. B. M. 1852 R.
 oblongus Aubé 'R.
 parallelus Say. Cal.
 catascopium Say.
 interruptus Say.
 griseostriatus Aubé 'R.
 subpubescens Lec. Cal.
 hirtellus Lec.
 nigellus Mann. B. M. 1853 R.
 vilis Lec. Cal.
 ruficapillus Mann. B. M. 1852 R.
 rufinus Mann. B. M. 1852 'R.
 decemlineatus Mann. B. M. 1853 R.
 lutescens Lec. Cal.

LACCOPHILUS Leach.

truncatus Mann. B. M. 1853 R. Or. Cal.
 vix a L. maculoso differt.

AGABUS Leach.

subopacus Mann. B. M. 1853 'R.
 dubius Mann. R.

tristis Aubé R.
 hypomelas Mann. R.
 scapularis Mann. B. M. 1852 'R.
 anthracinus Mann. B. M. 1852 R.
 morosus Lec. Cal.
 lutosus Lec. Cal.
 phaeopterus Kirby, Mann. B. M. 1853 'R.
 bicolor Kirby, Mann. B. M. 1853 'R.
 semipunctatus Kirby, Mann. B. M. 1853 'R.
 atratus Mann. ibid. 'R.
 brevicollis Lec. (infra) Cal.
 irregularis Mann. B. M. 1853 'R.

ILYBIUS Er.

quadrimaculatus Aubé R. Or.
 picipes, Mann. B. M. 1853 'R.
 Olymbetes picipes Kirby.

COLYMBETES Clairv.

divisus Aubé R. Or. Cal.
 obscuratus Mann. (Cymatopterus) B. M. 1853 'R.
 dolabratus Er. Mann. (Cymatopterus) ibid. 'R.
 Dytiscus dolabratus Payk.

ACILIUS Leach.

abbreviatus Aubé R. Or.
 latiusculus Lec. (infra) Cal.

DYTISCUS Linn.

confluens Say. R.
 Ooligotukii Kirby, Mann. B. M. 1852 and 1853.
 parvulus Mann. ibid. 1853 R.
 anxius Mann. R. Or. Cal.
 marginicollis Lec.
 sublimbatus Lec. (infra) Or.

GYRINIDAE.

GYRINUS Linn.

picipes Aubé R.
 consobrinus Lec. Cal.

HYDROPHILIDAE.

HELOPHORUS Fabr.

obscurus Lec. Cal.
 auricollis Esch. 'R.
 inquinatus Mann. B. M. 1852 R.
 consimilis Mann. B. M. 1853.
 an auricollis Esch?
 angustulus Mann. B. M. 1853 'R.

OCHTHEBIUS Leach.

Holmbergi Mann. B. M. 1853 R.

LACCOBIUS Er.

ellipticus Lec. Proc. Acad. Nat. Sc. 7, 363 Cal.

BEROSUS Leach.

punctatissimus Lec. Cal.
 maculosus Mann. 'R.

HYDROPHILUS Geoffroy.

- triangularis Say Cal.
Hydrophilus lugubris Motsch.
Stethoxus subsulcatus Lec.
californicus Lec. Proc. Acad. Nat. Sc. 7, 367 Cal.
ellipticus Lec. ibid 7, 368 Cal.

PHILHYDRUS Sol.

- carinatus Lec. Proc. Acad. Nat. Sc. 7, 370 Cal.
diffusus Lec. ibid. Cal.

HYDROBIUS Leach.

- seriatus Lec. Proc. Acad. Nat. Sc. 7, 372 Cal.
? *fucipes* † Mann. B. M. 1853 'R.

CERCYON Leach.

- fimbriatum Mann. B. M. 1852 R. Cal.
limbatum Mann. R.
fulvipenne Mann. B. M. 1852 R.
adumbratum Mann. R.
posticatum Mann. B. M. 1852 R.
lunigerum Mann. B. M. 1853 'R.

SILPHALES.

NECROPHORUS Fabr.

- marginatus Fabr. Cal.
guttula Motsch. Cal.
nigrita Mann. Cal.
pollinator Lec. (infra) Or.
tardus Mann. Bull. Mosc. 1853 'R.
maritimus Mann. B. M. 1843. R.
infodiens Mann. B. M. 1853 R.
confossor Lec. Proc. Acad. Nat. Sc. 7, 19 Or.
? *pollinator* Mann. B. M. 1853 'R.
defodiens Mann. 'R.
mortuorum Fabr. Mann. B. M. 1853 'R.

SILPHA Linn.

- lapponica, Linn. R. Or. Cal.
caudata Say.
tuberculata Germ.
californica Mann.
ramosa Say Or. Cal.
cervaria Mann.
sagax Mann. B. M. 1853 'R.

NECROPHILUS Latr.

- hydrophiloides Mann. R. Or. Cal.
ater Motsch. var.
latus Mann. B. M. 1852 R.

SPHAERITES Duftsch.

- politus Mann. R.

LYROSOMA Mann.

- opaca Mann. B. M. 1853 'R.

CATOPS Payk.

- cadaverinus Mann. R.
cryptophagoides Mann. B. M. 1852 'R.
brunnipennis Mann. B. M. 1853 R.

- luridipennis Mann. B. M. 1853 R.
californicus Lec. Proc. Acad. Nat. Sc. 6 Cal.
? *Frankenhaeuseri* Mann. B. M. 1852 'R.

COLON Herbst.

- inermis Mann. B. M. 1852 'R.
magnicollis Mann. B. M. 1853 'R.
clavatus Mann. B. M. 1853 'R.

ANISOTOMA Illiger.

- lateritia Mann. B. M. 1852 'R.
laeta Mann. B. M. 1853 'R.
curvata Mann. ibid 'R.

HYDNOBIUS Schmidt.

- punctostriatus Mann. B. M. 1853 'R.
Leiodes punctostriatus Kirby.

AGATHIDIUM Illiger.

- angulare Mann. B. M. 1852 R.
pulchrum Lec. Proc. Acad. Nat. Sc. 6, 286 Cal.
concinnum Mann. B. M. 1852 R.
effluens Mann. B. M. 1853 'R.
mandibulatum Mann. B. M. 1853 'R.
rotundulum Mann. B. M. 1852 R.
brunnipenne Lec. R.
Litochrus brunnipennis Mann. B. M. 1852.

CLAMBUS Fischer.

- oblongulus Mann. B. M. 1853 R.

SCYDMAENIDAE.

AEGIALITES Mann.

- debilis Mann. B. M. 1853 'R.
Elosomo ? *californica* Motsch.

EUTHEIA Stephens.

- scitula Mäklin, Bull. Mosc. 1852 'R.

SCYDMAENUS Latr.

- sparsus Lec. Proc. Acad. Nat. Sc. 6, 151 Cal.
angustus Lec. ibid. Cal.
gracilis Lec. ibid. Cal.
biformis Mäklin, B. M. 1852 'R.
californicus Motsch. 'R. Cal.

PSELAPHIDAE.

CTENISTES Reichenb.

- pulvereus Lec. Cal.

TYCHUS Leach.

- puberulus Lec. Cal.
tenellus Lec. Cal.

BATRISUS Aubé.

- albionicus Aubé Cal.

BRYAXIS Leach.

- compar Lec. Cal.
albionica Motsch. 'R. Cal.

EUPLECTUS, Leach.		
parviceps <i>Mäklin</i> , Bull. Mosc. 1852	.....	' R.
clavicornis <i>Mäklin</i> , (<i>Trimium</i> ,) <i>ibid.</i>	.....	' R.
STAPHYLINIDAE.*		
BOLITOCHARA Mann.		
notata <i>Mann</i> , B. M. 1852	.....	' R.
MYRMEDONIA Er.		
angularis <i>Mäklin</i> , B. M. 1853	.....	' R.
HOMALOTA Mann. (emend. Er.)		
granulata <i>Mann</i>	.....	R.
comparabilis <i>Mäklin</i> , B. M. 1853	.....	R.
maritima <i>Mann</i>	.....	R.
littoralis <i>Mäklin</i> , B. M. 1853	.....	R.
fucicola <i>Mäklin</i> , B. M. 1853	.....	R.
<i>Tachyusa fucicola</i> <i>Mäklin</i> , B. M. 1852.		
picipennis, <i>Mann</i>	.....	R.
vasta <i>Mäklin</i> , B. M. 1853	.....	' R.
laevicollis <i>Mäklin</i> , B. M. 1852	.....	' R.
cursor <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
nitens <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
moesta <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
pratensis <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
geniculata <i>Mäklin</i> , <i>ibid.</i>	.....	R.
planaris <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
breviuscula <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
OXYPODA Mann.		
irrasa <i>Mäklin</i> , B. M. 1853	.....	R.
ALEOCHARA Grav.		
castaneipennis <i>Mann</i>	.....	R.
bimaculata <i>Grav. Mäkl.</i> B. M. 1853	.....	R.
sulcicollis <i>Mann</i>	.....	R.
cognata <i>Mäklin</i> , B. M. 1852	.....	R.
GYROPHAENA Mann.		
geniculata <i>Mäklin</i> , B. M. 1853	.....	R.
TACHINUS Grav.		
nigricornis <i>Mann</i>	.....	R.
instabilis <i>Mäklin</i> , B. M. 1853	.....	' R.
frigidus <i>Er.</i>	.....	R.
circumcinctus <i>Mäklin</i> , B. M. 1853	.....	R.
maculicollis <i>Mäklin</i> , <i>ibid.</i>	.....	R.
propinquus <i>Mann</i>	.....	' R.
Elongatus <i>Gyll</i>	.....	' R.
apterus <i>Mäklin</i> , B. M. 1853	.....	' R.
BOLITOBIUS Stephens.		
poecilus <i>Mann</i> , B. M. 1852	.....	R.
biseriatus <i>Mann</i>	.....	' R.
MYCETOPORUS Mann.		
insignis <i>Mäklin</i> , B. M. 1853	.....	' R.
nigrans <i>Mäklin</i> , B. M. 1853	.....	' R.
OTHIUS Stephens.		
macrocephalus <i>Er.</i>	.....	R.
californicus <i>Mann</i>	.....	' R.
THINOPINUS Lec.		
pictus <i>Lec.</i> , (<i>infra</i>).	.....	R. Cal.
<i>Trichocanthus variegatus</i> <i>Motsch.</i>		
STAPHYLINUS Linn.		
villosus <i>Grav.</i>	.....	Cal.
bicinctus <i>Mann</i>	.....	R. Or. Cal.
tarsalis <i>Mann</i>	.....	' R.
crassus <i>Mann</i>	.....	R.
PHILONTHUS Leach.		
Siegwaldi <i>Mann</i>	.....	Cal. R.
albionicus <i>Mann</i>	.....	' Cal.
aterrimus <i>Er. Mäklin</i> , B. M. 1853	.....	' R.
picipennis <i>Mäklin</i> , B. M. 1852	.....	' R.
femoralis <i>Mäklin</i> , B. M. 1853	.....	R.
canescens <i>Mäklin</i> , <i>ibid.</i>	.....	R. Or. Cal.
QUEDIUS Leach.		
plagiatus <i>Mann</i>	.....	' R.
longipennis <i>Mann</i>	.....	R.
pediculus <i>Er.</i>	.....	R.
erythrogaster <i>Mann</i> , B. M. 1853	.....	R.
melanocephalus <i>Mann. ibid.</i>	.....	' R.
brunnipennis <i>Mäklin</i> , B. M. 1852	.....	' R.
rufipennis <i>Mäklin</i> , B. M. 1853	.....	' R.
aenescens <i>Mäklin</i> , B. M. 1852	.....	R.
sublimbatus <i>Mäklin</i> , B. M. 1853	.....	R.
marginalis <i>Mäklin</i> , B. M. 1852	.....	R.
molochinus <i>Grav.</i>	.....	' R.
hyperboreus <i>Er.</i>	.....	' R.
LIPAROCEPHALUS Mäklin.		
brevipennis <i>Mäklin</i> , B. M. 1853	.....	' R.
STENUS Latr.		
maritimus <i>Motsch.</i>	.....	R.
adsector <i>Mäklin</i> , B. M. 1852	.....	' R.
parallelipedus <i>Mäklin</i> , <i>ibid.</i>	.....	' R.
congener <i>Mäklin</i> , B. M. 1853	.....	R.
immarginatus <i>Mäklin</i> , B. M. 1853	.....	' R.
cariniceps <i>Mäklin</i> , B. M. 1852	.....	' R.
brevipennis <i>Mäklin</i> , B. M. 1852	.....	R.
BLEDIUS Leach.		
longipennis <i>Mäklin</i> , B. M. 1852	.....	' R.
albonotatus <i>Mäklin</i> , B. M. 1853	.....	' R.
OXYTELUS Grav.		
fuscipennis <i>Mann</i>	.....	R.
PHLOCONAEUS Er.		
biimpressus <i>Mäklin</i> , B. M. 1852	.....	R.

* Only the described species are mentioned in the Catalogue. I have not included the numerous species collected by me in California, nearly all of which are nondescript, since subsequent investigations would be much confused if they were to be made known separately.

SYNTOMIUM, Curtis.	
confragosum <i>Mäklin</i> , B. M. 1852.	' R.
OLISTHAERUS Er.	
megacephalus Er. <i>Mann</i> . B. M. 1853.	R.
ANTHOPHAGUS Grav.	
laticollis <i>Mann</i> .	' R.
LESTEVA Latr.	
fusconigra <i>Mäklin</i> , B. M. 1853.	' R.
<i>Phlaeopterus fusconiger</i> Motsch. Et. Ent. 1852, p. 78.	
ARPEDIUM Er.	
estaceum <i>Mann</i> . B. M. 1843.	R.
maculicollis <i>Mann</i> .	' R.
LATHRIMAEUM Er.	
subcostatum <i>Mäklin</i> , B. M. 1852.	R.
fimetarium <i>Mann</i> . B. M. 1852.	R.
<i>Omalium fimetarium</i> Mann.	
<i>Anthobium fimetarium</i> Er.	
ACIDOTA Stephens.	
Frankenhaeuseri <i>Mäklin</i> , B. M. 1853.	' R.
OLOPHRUM Er.	
latum <i>Mäklin</i> , B. M. 1853.	' R.
parvulum <i>Mäklin</i> , ibid.	' R.
convexum <i>Mäklin</i> , ibid.	R.
marginatum <i>Mäklin</i> , ibid.	R.
DELIPHRUM Er.	
brevicollis <i>Mäklin</i> , B. M. 1853.	R.
<i>Arpedium brevicollis</i> <i>Mäklin</i> , ibid 1852.	
OMALIUM Grav.	
plagiatum <i>Mann</i> .	' R.
strigipenne <i>Mäklin</i> , B. M. 1852.	R.
humile <i>Mäklin</i> , B. M. 1853.	' R.
flavipenne <i>Mäklin</i> , ibid.	' R.
planipenne <i>Mäklin</i> , ibid.	' R.
tumidulum <i>Mäklin</i> , ibid.	' R.
foraminosum <i>Mäklin</i> , B. M. 1852.	R.
exsculptum <i>Mäklin</i> , B. M. 1852.	' R.
laesicollis <i>Mäklin</i> , ibid.	R.
segmentarium <i>Mäklin</i> , ibid.	' R.
longulum <i>Mäklin</i> , ibid.	R.
callosum <i>Mäklin</i> , ibid.	' R.
ANTHOBIIUM Stephens.	
pothos <i>Mann</i> .	R.
rugulosum <i>Mäklin</i> , B. M. 1853.	' R.
PROTEINUS Latr.	
limbatus <i>Mäklin</i> , B. M. 1852.	R.
basalis <i>Mäklin</i> , B. M. 1852.	R.
MEGARTHURUS Stephens.	
pictus <i>Motsch</i> .	R.
atratus <i>Mäklin</i> , B. M. 1852.	R.
angulicollis <i>Mäklin</i> , B. M. 1852.	R.

MICROPEPLUS Latr.	
costatus <i>Mäklin</i> , B. M. 1852.	' R.
laticollis <i>Mäklin</i> , B. M. 1853.	R.
brunneus <i>Mäklin</i> , B. M. 1852.	' R.
costipennis <i>Mäklin</i> , B. M. 1853.	R.

TRICHOPTERYGIA.

TRICHOPTERYX Kirby.	
laticollis <i>Mäklin</i> , B. M. 1852.	R.
insularis <i>Mäklin</i> , B. M. 1852.	R.
sitkhaensis Allibert, Rev. Zool. 1847, 196.	' R.
<i>Ptilium sitkaense</i> Motsch. B. M. 1845, 526; tab. 10, f. 13.	
rotundata <i>Motsch</i> . (Achratrichis.)	Cal.

PTILIUM GYLL.	
collani <i>Mäklin</i> , B. M. 1853.	' R.

PTENIDIUM Er.	
pullum <i>Mäklin</i> , B. M. 1852.	R. Cal.

SCAPHIDILIA.

SCAPHISOMA Leach.	
castaneum <i>Lec</i> .	Cal.
<i>Scapidium castaneum</i> Motsch.	

HISTERIDAE.

HISTER Linn.	
sellatus <i>Lec</i> . (infra.)	Cal.
sexstriatus <i>Lec</i> .	Cal.
immunis <i>Er</i> .	Cal.
californicus <i>Marseul</i> , Ann. Ent. Soc. Fr. 3d, 2, 544.	' Cal.

SAPRINUS Er.	
interceptus <i>Lec</i> .	Cal.
interstitialis <i>Lec</i> .	Cal.
obscurus <i>Lec</i> .	Cal.
lugens <i>Er</i> .	Or. Cal.
<i>californicus</i> Mann.	
oregonensis <i>Lec</i> .	Or. Cal.
insertus <i>Lec</i> .	Cal.
obductus <i>Lec</i> .	Or.
vestitus <i>Lec</i> .	Cal.
lubricus <i>Lec</i> .	Cal.
fimbriatus <i>Lec</i> .	Cal.
estriatus <i>Lec</i> . (infra.)	Or.
lucidulus <i>Lec</i> .	Cal.
sulcifrons <i>Mann</i> .	Cal.

TERETRIUS Er.	
obliquulus <i>Lec</i> . (infra.)	Cal.

PHALACRIDAE.

PHALACRUS Payk.	
penicellatus <i>Say</i> .	Or. Cal.

OLIBRUS Er.	
rufipes <i>Lec</i> . Proc. Acad. Nat. Sc. 8.	Or.
obtusulus <i>Lec</i> . ibid.	Cal.
aquatilis <i>Lec</i> . ibid.	Cal.

NITIDULIDAE.

COLASTUS Er.

tinctus Lec. ----- Cal.
Strongylus ? tinctus Mann.

CARPOPHILUS Leach.

hemipterus Stephens (mercat. illatus) ----- R. Cal.
dimidiatus Er. (mercat. illatus) ----- ' R.

EPURAEA Er.

nubila Lec. (infra) ----- Cal.
convexiuscula Mann. ----- R.
placida Mäklin, B. M. 1853 ----- ' R.
adumbrata Mann. B. M. 1852 ----- R.
ambigua Mann. ----- ' R.
truncatella Mann. ----- R.
planulata Er. ----- R.
nigra Mäklin, B. M. 1853 ----- ' R.
flavomaculata Mäklin, ibid. ----- ' R.
linearis Mäklin, ibid. ----- ' R.
infusata Mäklin, ibid. ----- ' R.

NITIDULA Fabr.

ziczac Say, ----- Or.

OMOSITA Er.

inversa Lec. (infra) ----- Cal.

MELIGETHES Steph.

rufimanus Lec. (infra) ----- Cal.
moerens Lec. (infra) ----- Or.
seminulum Lec. (infra) ----- Or.

Ips Fabr.

Dejeanii Kirby, ----- R.
sepulchralis Randall, (Maine.)

RHIZOPHAGUS Herbst.

dimidiatus Mann. ----- R.
sculpturatus Mann. B. M. 1852 ----- ' R.
abbreviatus Motsch. ----- Cal.

TROGOSITIDAE.

TEMNOCHILA Westwood.

chlorodia Lac. Gen. Col. 2, 341 ----- Cal.
Trogosita chlorodia Mann.
viridicyanea Lac. ibid. ----- Or. Cal.
Trogosita viridicyanea Mann.

TROGOSITA Oliv.

mauritanica Oliv. (mercat. illata) ----- R. Cal.
? pusillima Mann. ----- ' R.

PELTIS Kug.

Pippingsköldii Mann. B. M. 1852, ----- R. Or.

PELASTICA Mann.

tuberculata Mann. B. M. 1852, ----- R.

COLYDII.

RHAGODERA Er.

tuberculata Mann. ----- Cal.

CERYLON Latr.

simplex Lec. (infra) ----- Cal.

CUCUIIPES.

CUCUIUS Fabr.

puniceus Mann. ----- R. Or.

BRONTES Fabr.

truncatus Motsch. ----- R. Cal.

DENDROPHAGUS Schönh.

Cygnaci Mann. ----- ' R.
americanus Mann. B. M. 1853 ----- ' R.

LAEMOPHLOEUS Lap.

longipennis Mann. ----- ' R.

PEDIACUS Shuckhard.

subcarinatus Mann. B. M. 1852 ----- B.

SILVANUS Latr.

dentatus Say (mercat. illatus) ----- R. Cal.
surinamensis Stephens (mercat. illatus) ----- R. Cal.

CRYPTOPHAGIDAE.

CRYPTOPHAGUS Herbst.

californicus Mann. ----- ' Cal.
octodentatus Mäklin, B. M. 1852 ----- ' R.
quadridentatus Mann. ----- ' R.
tuberculosis Mäklin, B. M. 1852 ----- ' R.
quadrihamatus Mäklin, B. M. 1853 ----- ' R.
bidentatus Mäklin, B. M. 1853 ----- ' R.
punctatissimus Mäklin, B. M. 1853 ----- ' R.

PARAMECOSOMA Curtis.

serrata Er. ----- ' R.
Cryptophagus serratus Gyll.

ATOMARIA Stephens.

ferruginea Er. ----- ' R.
Cryptophagus ferrugineus Sahlb.
vespertina Mäklin, B. M. 1853 ----- ' R.
planulata Mäklin, ibid. ----- ' R.
Kamtschatica Motsch. Mäklin, ibid. ----- ' R.
fuscicollis Mann. B. M. 1852 ----- ' R.
fulvipennis Mann. ----- R.
lepidula Mäklin, B. M. 1852 ----- R.
laetula Lec. (infra) ----- Cal.

ANTHEROPHAGUS Latr.

suturalis Mäklin, B. M. 1853 ----- ' R.

LATHRIDIIDAE.

CORTICARIA Marsham.

spinulosa Mann. B. M. 1852 ----- ' R.
prionodera Lec. Proc. Acad. Nat. Sc. 7, 300 ----- Cal.
tenella Lec. ibid. 7, 301 ----- Cal.
herbivagans Lec. ibid. 7, 302 ----- Cal.
rufula Lec. ibid. 7, 303 ----- Cal.
canaliculata Mann. B. M. 1853 ----- ' R.

orbicollis *Mann.* B. M. 1853.....' R.
 deleta *Mann.* *ibid.*.....' R.
 exigua *Mann.* *ibid.*.....' R.
 ? trisignata *Mann.* B. M. 1852.....R.

LATHRIDIIUS Herbst.

quadricollis *Mann.*.....R.
 protensicollis *Mann.*.....R.
 costicollis *Lec.* Proc. Acad. Nat. Sc. 7, 303.....Cal.
 sobrinus *Mann.* B. M. 1852.....R.
 cordicollis *Mann.*.....' R.
 cinnamopterus *Mann.* B. M. 1853.....' R.
 fulvipennis *Mann.* *ibid.*.....' R.
 incisus *Mann.* *ibid.*.....' R.
 strangulatus *Mann.* *ibid.*.....' R.
 minutus *Mann.*.....' R.
 parallellocollis *Mann.*.....' R.
 curtulus *Mann.* B. M. 1853.....' R.
 crenatus *Lec.* Proc. Acad. Nat. Sc. 7, 304.....Cal.
 parviceps *Lec.* *ibid.*.....Cal.

MYCETOPHAGIDAE.

MYCETOPHAGUS Hellw.

pluriguttatus *Lec.*.....Cal.

LITARGUS Er.

transversus *Lec.*.....Cal.

DERMESTIDAE.

BYTURUS Latr.

griseus *Lec.* (infra).....Cal.

DERMESTES Linn.

Mannerheimii *Lec.* Proc. Acad. Nat. Sc. 7, 107.....Cal.
 marmoratus † *Mann.*.....
 talpinus *Mann.*.....Or. Cal.
 rattus *Lec.* Proc. Acad. 7, 108.....Cal.
 vulpinus *Fabr.*.....R. Cal.
 lupinus *Mann.*.....

ATTAGENUS Latr.

angularis *Mann.* B. M. 1853.....' R.

CRYPTORHOPALUM Guér.

triste *Lec.* Proc. Acad. Nat. Sc. 7, 111.....Cal.

ANTHRENUS Fabr.

lepidus *Lec.* Proc. Acad. Nat. Sc.Cal.
 varius *Fabr.* Er. (mercat. illatus).....Cal.
 ? apicalis *Mann.*.....' Cal.

BYRRHIDAE.

BYRRHUS Fabr.

cyclophorus Kirby, *Mann.* B. M. 1852.....' R

SYNCALYPTA Stephens.

setulosa *Mann.* B. M. 1853.....' R

PEDILOPHORUS Steffh.

acuminatus *Lec.* (infra).....R.

Morychus acuminatus *Mann.* B. M. 1852, 341.

oblongus *Lec.* (infra).....Or.

acuminatus † *Lec.* Proc. Acad. Nat. Sc. 7, 115.

SIMPLOCARIA Stephens.

nitida *Motsch.*.....R.
 metallica Er. *Mann.* B. M. 1853.....R.

AMPEICYRTA Er.

dentipes Er.Cal.

Eucyphus hybosoroides *Mann.*

chrysomelina Er. (infra).....Or.
 simplicipes *Mann.* B. M. 1852.....' R.

PARNIDAE.

LARA Lec.

avara *Lec.* Proc. Acad. Nat. Sc. 6, 43.....Cal.

HETEROCERIDAE.

HETEROCERUS Fabr.

tristis *Mann.* B. M. 1853.....' R.

SCARABAEIDAE.

LIGYRUS Burm.

gibbosus *Lec.* Proc. Acad. Nat. Sc. 8.....Or. Cal.

Scarabaeus gibbosus De Geer.

Podalgus variolosus Burm.

Bothynus obsoletus *Lec.* (var.)

CREMASTOCHILUS Knoch.

angularis *Lec.* (infra).....Cal.

POLYPHYLLA Harris.

decemlineata *Lec.*Or. Cal.

Melolontha 10-lineata Say.

TRYSSUS Er.

? comatus *Lec.* (infra).....Cal.

DIPLTAXIS Kirby.

brevicollis *Lec.* (infra).....Or.

subangulata *Lec.* (infra).....Or.

DICHELONYCHA Kirby.

valida *Lec.* (infra).....Cal.

fulgida *Lec.* (infra).....Or.

SERICA McLeay.

anthracina *Lec.* (infra).....Or. Cal.

CAMPTORHINA Kirby.

serotina *Lec.* (infra).....Cal.

HOPLIA Illiger.

irrorata *Lec.* (infra).....Or. Cal.

PLEOCOMA Lec.

fimbriata *Lec.* (infra).....Cal.

CANTHON Illiger.

simplex *Lec.* (infra).....Or. Cal.

APHODIUS Illiger.

aleutus *Esch.*.....' R.

ursinus *Mann.* B. M. 1853.....R.

- congregatus* Mann. B. M. 1853.....R.
guttatus Esch.....' R.
pectoralis Lec. (infra).....Cal.
rubidus Lec. (infra).....Cal.
pardalis Lec. (infra).....Cal.
subaeneus Lec. (infra).....Cal.
cadaverinus Er. Ins. Deutschl. 880.....' Cal.
Oxyomus cadaverinus Mann.
 AEGIALIA Latr.
caelata Lec. (infra).....Cal.
crassa Lec. (infra).....Cal.
cylindrica Mann. B. M. 1853.....R.
Oxyomus cylindricus Mann.
 TROX Fabr.
fascifer Lec. Proc. Acad. Nat. Sc. 7, 213.....Cal.
 PLATYCERUS Geoffroy.
oregonensis Westwood, Tr. Ent. Soc. 4, 277.....' Or. Cal.
 tab. 20, f. 9.
 SINODENDRON Fabr.
rugosum Mann. (infra).....Cal.
 BUPRESTIDAE.
 ANCYLOCHEIRA Esch.
Gibbsii Lec. (infra).....Or.
Langii Lec. (infra).....Or.
Buprestis Langii Mann.
rusticorum Lec.....Or. Cal.
Buprestis (Anoplis) rusticorum Kirby.
laeviventris Lec. (infra.)
adiecta Lec. Proc. Acad. 7, 17 (infra).....Or.
lauta Lec. ibid. (infra).....Or.
radians Lec. ibid. (infra).....Or.
?placida Lec. ibid.Or.
 BUPRESTIS Linn.
angulicollis Lec. (infra).....Cal.
 MELANOPHILA Esch.
Drummondi Lec.....R. Or.
Buprestis (Trachyteris) Drummondi Kirby.
Apatura Drummondi Lap.
Melanophila guttulata † Mann. B. M. 1853.
consputa Lec. (infra).....Cal.
appendiculata Mann.....' R.
Buprestis appendiculata Fabr.
 ANTHAXIA Esch.
expansa Lec. (infra).....Cal.
 CHRYSOBOTHRIS Esch.
femorata Fabr. (Buprestis) var?.....Or.
trinervia Mann. B. M. 1853.....R. Or.
Buprestis (Odontomus) trinervia Kirby.
Chrysobothris scabripennis Lap.
Chrysobothris cicatricosa Motsch. Et. Ent. 1852.
 DICERCA Esch.
pectorosa Lec. (infra).....Or.
crassicollis Lec. (infra).....Or.
- POLYCESTA Esch.
californica Lec. (infra).....Cal.
 ELATERIDAE.
 EPIPHANIS Esch.
cornutus Esch.....R.
 ANELASTES Kirby.
Latreillei Lec. Proc. Acad. 6, 46.....Or. Cal.
 PEROTHOPS Er.
Witticki Lec. (infra).....Cal.
 ATHOUS Esch.
scissus Lec. (infra).....Or.
vittiger Lec. Tr. Am. Phil. Soc. 10, 427.....Or.
ferruginosus, Esch.....R.
pallidipennis Mann.....R. Or.
rufiventris Esch.....' R.
triundulatus Mann. B. M. 1853.....' R.
 LIMONIUS Esch.
hispidus Lec. Tr. Am. Phil. Soc. 10, 432.....Cal.
ornatulus Lec. (infra).....Or.
 CORYMBITES Latr. (emend. Lec.)
nubilus Lec. Tr. Am. Phil. Soc. 10, 438.....Cal.
sericeus Esch. (Ludius) Mann. B. M. 1853.....' R.
glaucus Germ.....Or.
decoratus Mann. (Diacanthus) B. M. 1853.....' R.
parvicollis Mann. ibid.....' R.
bombycinus Germ.....' Or.
diversicolor Esch. (Ludius).....' Cal.
coniungens Lec. Tr. Am. Phil. Soc. 10, 440.....Cal.
Suckleyi Lec. (infra).....Or.
carbo Lec. Tr. Am. Phil. Soc. 10, 439.....Or.
lateralis Lec. Tr. Am. Phil. Soc. 10, 439.....Or.
confluens Gebler. (Elatr).....' R.
Diacanthus confluens Mann.
umbripennis Lec.....Cal.
Corymbites nubilipennis || Lec. Tr. Am. Phil. Soc. 10, 441.
resplendens Esch.....R.
furtivus Lec. Tr. Am. Phil. Soc. 10, 442.....Cal.
festivus Lec. (infra).....Or.
obscurus Lec.....Cal.
cribrosus Lec.....Cal.
maurus Lec.....Or.
lobatus Mann. B. M. 1853.....R. Or.
Diacanthus lobatus Mann. B. M. 1846.
Corymbetes telum Lec. Tr. Am. Phil. Soc. 10, 445.
umbricola Mann.....R.
Ludius umbricola Esch.
caricinus Germ.....' R.
Diacanthus caricinus Mann
volitans Mann.....R.
Ludius volitans Esch.
semiluteus Lec.....Cal.
sagitticollis Lec.....R.
Ludius sagitticollis Esch.
angularis Lec. Tr. Am. Phil. Soc. 10.....Or.

spectabilis Mann. B. M. 1852 'R.
serricornis Mann. (Diacanthus) 'Cal.
angusticollis Mann. (Diacanthus) 'R.
leucaspis Germ. (Diacanthus) 'Or.
rupestris Germ. 'Or.

ASAPHES Kirby.

morio Lec. Tr. Am. Phil. Soc. 10, 450 Or

AGRIOTES Esch. (emend. Lec.)

subustus Lec. Tr. Am. Phil. Soc. 10, 458 Cal.
sellatus Mann. (Dolopius) B. M. 1852 'R.
californicus Mann. (Dolopius) 'Cal.
macer Lec. (infra) Or.

ANCHASTUS Lec.

recedens Lec. Tr. Am. Phil. Soc. 10, 460 Cal.
puberulus Lec. (vix a praeced. differt.) Cal.

Cryptohypnus puberulus Mann.

cinereipennis Mann. (Cryptohypnus) 'Cal.

ELATER Linn. (emend. Esch.)

phoenicopterus Lec. Or.
Ampedus phoenicopterus Germ.

rhodopus Lec. (infra) Or.
carbonicolor Esch. R.
nigrinus Payk. Mann. B. M. 1853 'R.
caprella Lec. (infra) Or.

CRATONYCHUS Er.

oregonensis Lec. Trans. Am. Phil. Soc. 10, 480 Or.

MONOCREPIDIUS Esch. (emend. Lec.)

comis Lec. l. c. 10, 484 Cal.

CRYPTOHYPNUS Esch.

littoralis Germ. R.
squalidus Lec. Tr. Am. Phil. Soc. 10, 487 Cal.
nocturnus Dej. 'R.

Hypolithus nocturnus Esch.

limbatus Mann. B. M. 1852 R.
musculus Mann. 'R.

Elater musculus Esch.

hyperboreus Dej. Mann. B. M. 1853 'R.
impressicollis Mann. B. M. 1853 'R.
scarificatus Mann. B. M. 1853 R.
fallax Mann. ibid. 'R.
vestitus Mann. ibid. 'R.
lucidulus Mann. ibid. 'R.
restrictulus Mann. ibid. 'R.

ADELOCERA Latr.

aurorata Lec. Tr. Am. Phil. Soc. 10 Or.

Elater auroratus Say.

MELANACTES Lec.

densus Lec. Tr. Am. Phil. Soc. 10, 494 Cal.

ALAEUS Esch.

myops Esch. Or.

Elater myops Fabr.

CARDIOPHORUS Esch.

latiusculus Esch. 'Cal.

tumidicollis Lec. Tr. Am. Phil. Soc. 10, 498 Or.
californicus Mann. 'Cal.
tenebrosus Lec. Tr. Am. Phil. Soc. 10, 498 Cal.
tantillus Mann. 'Cal.
transfugus Lec. Tr. Am. Phil. Soc. 10, 500 Cal.

ATOPIDAE.

STENOCOLUS Lec.

scutellaris Lec. Proc. Acad. Nat. Sc. 6, 229 Cal.

CYPHONIDAE.

HELODES Latr.

concinna Lec. Proc. Acad. Nat. Sc. 6, 353 Cal.
variabilis Guér. Mann. B. M. 1853 'R.

LAMPYRIDAE.

ELLYCHNIA Lec.

facula Lec. Proc. Acad. Nat. Sc. 7, 17, (infra) Or.
corrusca Lec. ibid. 5, 333, (fide Klug.) 'Or.
Lampyris corrusca Linn.

TELEPHORIDAE.

SILIS Charp.

pallida Mann. R. Cal.
lutea Lec. Mels. Cat. 78.
pallens Lec. Proc. Acad. Nat. Sc. 5, 339.

TELEPHORUS Geoffr.

lautus Lec. Proc. Acad. 5, 340 Cal.
grandicollis Lec. ibid. Cal.
divisus Lec. ibid. Cal.
notatus Lec. Cal.

Cantharis notata Mann.

larvalis Lec. (infra) Or.

PODABRUS (Fischer) Westwood.

pruinus Lec. Proc. Acad. 5, 344 Or.
piniphilus Dej. R. Or.

Rhagonycha piniphila Esch.

sericatus Mann., (Rhagonycha) 'R.
binodulus Mann., (Rhagonycha) 'R.
anthracinus Mann., (Rhagon.) B. M. 1853 'R.

LYCIDAE.

ANARHYNCUS Guérin.

hamatus Mann., (Dictyopterus) 'R.
simplicipes Lec. R.

Dictyopterus simplicipes Mann.

MELYLIDES.

COLLOPS Er.

histrio Er. Cal.

MALACHIUS Fabr. (emend. Er.)

auritus Lec. Proc. Acad. Nat. Sc. 6, 165 Cal.

ATELESTUS Er.

? *collaris* Lec. Proc. Acad. Nat. Sc. 6, 168 Cal.

DASYTES Fabr.

<i>canescens</i> Mann.	Cal.
<i>laticollis</i> Mann.	' Cal.
<i>parvicollis</i> Mann.	' Cal.
<i>rotundicollis</i> Lec. Pr. Acad. 6, 170.	Cal.
<i>difficilis</i> Lec. <i>ibid.</i>	Cal.

CLERIDAE.

PERILYPUS Spin.

<i>carbonarius</i> Spin.	' Cal.
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COLYPHUS Spin.

<i>signaticollis</i> Spin.	' Cal.
<i>cinctipennis</i> Spin.	' Cal.
<i>rufipennis</i> Spin.	' Cal.
<i>interceptus</i> Spin.	' Cal.

CYMATODERA Gray.

<i>angustata</i> Spin.	Cal.
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TRICHODES Herbst.

<i>ornatus</i> Say.	Or. Cal.
<i>Douglassianus</i> White, Brit Mus. Cat. 60.	
<i>Hurtwegianus</i> White, <i>ibid.</i>	

CLERUS Geoffr.

<i>sphegeus</i> Fabr.	Or.
<i>eximius</i> Mann.	Cal.
<i>holosericeus</i> White, l. cit.	
<i>undulatus</i> Say.	R.
<i>Thanasimus abdominalis</i> Kirby.	
<i>Thanasimus pictus</i> Spin.	

ENOPLIUM Fabr.

<i>dichroum</i> Lec. (<i>infra</i>).	Cal.
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CORYNETES Fabr.

<i>rufipes</i> Fabr., (<i>mercat. illatus</i>)	Cal.
<i>ruficollis</i> Fabr., (<i>mercat. illatus</i>)	R. Cal.
<i>marginellus</i> Chev.	' Cal.

ACREPIS Lec.

<i>maculata</i> Lec.	Cal.
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PTINIORES.

PTINUS Linn.

<i>fur</i> Linn., (<i>mercat. allatus</i>)	R. Cal.
<i>interruptus</i> Lec., (<i>infra</i>)	Cal.

DINODERUS Stephens.

<i>substriatus</i> Steph. Mann. B. M. 1853.	' R.
<i>Apate substriata</i> Paykull.	

SINOXYLON Duftschm.

<i>declive</i> Lec., (<i>infra</i>)	Cal.
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EXOPS Curtis.

<i>Stoutii</i> Lec.	Cal.
<i>Alloeoenemis Stoutii</i> Lec. Proc. Acad. 6, 232.	
<i>ovicollis</i> Lec., (<i>infra</i>)	Cal.

ANOBIUM Fabr.

<i>paniceum</i> Fabr., (<i>mercat. allatum</i>)	R. Cal.
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CIS Latr.

<i>vitulus</i> Mann.	Cal.
<i>tridentatus</i> Mann. B. M. 1852.	R.
<i>biarmatus</i> Mann. B. M. 1852.	R.
<i>americanus</i> Mann. B. M. 1852.	' R.
<i>ephippiatus</i> Mann. B. M. 1853.	' R.

TENEBRIONIDAE.

TRIOROPHUS Lec.

<i>rugiceps</i> Lec.	Cal.
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EURYMETOPON Esch.

<i>rufipes</i> Esch.	Cal.
<i>atrum</i> Lec.	Cal.
<i>ochraceum</i> Esch.	' Cal.

NYCTOPORIS Esch.

<i>galeata</i> Lec., (<i>infra</i>)	Cal.
<i>cristata</i> Esch.	Cal.
<i>aequicollis</i> Esch.	Cal.

DYSMATHES Mann.

<i>Sahlbergi</i> Mann. B. M. 1853.	' R.
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CENTRIOPTERA Mann.

<i>caraboides</i> Mann.	' Cal.
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NOSODERMA Sol.

<i>diabolicum</i> Lec., (<i>infra</i>)	Cal.
<i>porcatum</i> Lec. Proc. Acad. Nat. Sc. 6, 235.	Or. Cal.

USECHUS Motsch.

<i>lacerta</i> Motsch.	' Cal.
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ELEODES Esch.

<i>grandicollis</i> Mann.	Cal.
<i>gigantea</i> Mann.	Cal.
<i>quadricollis</i> Esch.	Cal.
<i>dentipes</i> Esch.	Cal.
<i>connexa</i> Lec., (<i>infra</i>)	Or.
<i>sulcipennis</i> Mann.	Or. Cal.
<i>Fischeri</i> Mann.	Cal.
<i>marginata</i> Esch.	Cal.
<i>granulata</i> Lec., (<i>infra</i>)	Or.
<i>producta</i> Esch.	Cal.
<i>humeralis</i> Lec., (<i>infra</i>)	Or.
<i>planata</i> Esch.	Cal.
<i>reflexicollis</i> Mann.	' Cal.
<i>parvicollis</i> Esch.	Cal.
<i>clavicornis</i> Esch.	' Cal.
<i>rotundipennis</i> Lec., (<i>infra</i>)	Or.
<i>stricta</i> Lec., (<i>infra</i>)	Or.
<i>subligata</i> Lec., (<i>infra</i>)	Or.
<i>intricata</i> Mann.	Cal.
<i>cordata</i> Esch.	Cal.
<i>tuberculata</i> Esch.	Cal.
<i>pimelioides</i> Mann.	Or. Cal.

AMPHIDORA Esch.

<i>littoralis</i> Esch.	Cal.
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HELOPS Fabr.

<i>rugulosus</i> Lec.	Cal.
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<i>californicus</i> Mann.	Or. Cal.
<i>laetus</i> Lec., (infra)	Or.
APOCYPHA Esch.	
<i>anthicoides</i> Esch.	Cal.
<i>dyschirioides</i> Lec.	Cal.
CONONOTUS Lec.	
<i>sericans</i> Lec., (infra)	Cal.
<i>punctatus</i> Lec.	Cal.
CONIONTIS Esch.	
<i>viatica</i> Esch.	Cal.
<i>puncticollis</i> Lec.	Cal.
<i>affinis</i> Lec.	Cal.
<i>Eschscholtzii</i> Mann.	Cal.
<i>ovalis</i> Lec.	Or.
<i>nemoralis</i> Esch.	Cal.
<i>subpubescens</i> Esch.	Cal.
COELUS Esch.	
<i>ciliatus</i> Esch.	Cal.
NOTIBIUS Lec.	
<i>puncticollis</i> Lec.	Cal.
CONIBIUS Lec.	
<i>seriatus</i> Lec.	Cal.
BLAPSTINUS († Dej.) Waterhouse.	
<i>brevicollis</i> Lec.	Cal.
<i>pulverulentus</i> Dej.	Or. Cal.
<i>Emmenastus rugosus</i> Motsch., (fide Mann.)	
EULABIS Esch.	
<i>rufipes</i> Esch.	Cal.
<i>bicarinata</i> Esch.	Cal.
CALCAR Latr.	
<i>estriatus</i> Lec.	Cal.
<i>Tenebrio estriatus</i> Lec.	
TENEBRIO Linn.	
<i>molitor</i> Linn., (mercat. allatus)	R.
HETEROPHAGA.	
<i>mauritanica</i> Mann. B. M. 1852, (mercat. allata)	R.
<i>Tenebrio mauritanicus</i> Fabr.	
CIBDELIS Mann.	
<i>Blaschii</i> Mann.	Cal.
NYCTIBATES.	
<i>serrata</i> Mann., (infra)	Or.
COELOCNEMIS Mann.	
<i>magna</i> Lec.	Cal.
<i>dilaticollis</i> Mann.	Cal.
<i>californica</i> Mann.	Cal.
TRIBOLIUM Macleay.	
<i>ferrugineum</i> Macleay, (mercat. allatum)	R. Cal.
<i>Trogosita ferruginea</i> Fabr.	

GNATHOCERA Thunb.	
<i>cornuta</i> Mann. (Cerandria) B. M. 1852, (mercat. ill.)	R.
<i>Trogosita cornuta</i> Fabr.	
<i>maxillosa</i> Mann. (Cerandria) ibid. (mercat. illata)	R.
<i>Trogosita maxillosa</i> Fabr.	
PLATYDEMA Lap.	
<i>oregonense</i> Lec., (infra)	Or.
PHALERIA Latr.	
<i>globosa</i> Lec., (infra)	Cal.
<i>picta</i> Mann.	R.
CISTELA Fabr.	
<i>sericea</i> Say, var.?	Cal.
MELANDRYADAE.	
SERROPALPUS Payk.	
<i>obsoletus</i> Hald.	Or.
? an var. <i>substriati</i> Hald.	
<i>striatus</i> Hellenius, Mann. B. M. 1853.	R.
DIRCAEA Fabr.	
<i>Holmbergii</i> Mann. B. M. 1852.	R.
HALLOMENUS Payk.	
<i>basalis</i> Mann. B. M. 1853.	R.
STENOTRACHELUS Latr.	
<i>obscurus</i> Mann. B. M. 1852.	R.
PYTHO Latr.	
<i>deplanatus</i> Mann. B. M. 1853.	R.
PRIOGNATHUS Lec.	
<i>monilicornis</i> Lec.	R.
<i>Pytho Sahlbergi</i> Mann.	
<i>Dytilus monilicornis</i> Randall.	
PYROCHROIDAE.	
PEDILUS Fischer.	
<i>punctulatus</i> Lec.	Cal.
DENDROIDES Latr.	
<i>ephemeroides</i> Lec.	R.
<i>Pogonocerus ephemeroides</i> Mann. B. M. 1852.	
MORDELLONAE.	
ANASPIS Latr.	
<i>luteipennis</i> Lec.	Cal.
<i>atra</i> Lec.	Cal.
<i>pallens</i> Mann.	R. Or.
<i>sericea</i> Mann.	R.
MORDELLA Fabr.	
<i>scutellaris</i> Fabr.	Cal.
MELOIDAE.	
MELOE Linn.	
<i>strigulosus</i> Mann. B. M., 1853.	R. Cal.

LYTTA Linn.

Cooperi Lec. Proc. Acad. 7, 18, (infra.)	Or.
Childii Lec. (infra)	Cal.
moerens Lec.	Cal.
cyanipennis Lec.	Or.
smaragdula Lec. Proc. Acad. 6, 335.	Cal.
stygica Lec.	Or.
Rathvoni Lec. Proc. Acad. 6, 335.	Cal.
chalybea Lec.	Or.
puncticollis Lec.	Or. Cal.

Epicauta puncticollis Mann.

oblita Lec.	Cal.
maura Lec.	Cal.

NEMOGNATHA Fabr.

apicalis Lec. Proc. Acad. Nat. Sc. 6, 345.	Or.
dubia Lec. ibid, 346.	Cal.
decipiens Lec. ibid. 347.	Or.
scutellaris Lec. ibid. 347.	Cal.

ANTHICIDAE.

NOTOXUS.

cavicornis Lec.	Cal.
talpa Ferté.	Cal.
elegantulus Ferté.	Cal.

ANTHICUS Fabr.

nitidulus Lec.	Cal.
californicus Ferté.	Cal.
punctulatus Lec.	Cal.
nigrita Mann. B. Mosc. 1853.	R.
biguttulus Lec.	Cal.
nigritulus Lec.	Cal.
obscorellus Lec.	Cal.
quadrilunatus Ferté.	Cal.
squamosus Ferté.	Cal.
lugubris Ferté.	Cal.

OEDEMERIDAE.

DITYLUS Fischer.

quadricollis Lec. (infra)	Or.
consors Lec.	
gracilis Lec. Pr. Acad. 7, 18 (infra)	Or.
vestitus Lec. (infra)	Or.

ASCLERA Schmidt.

bicolor Lec.	Or.
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NACERDES Steven.

quadrimaculata Mann. B. M. 1853.	R. Cal.
<i>Probosca 4-maculata</i> Motsch. Et. Ent. 1852, 78.	

SALPINGIDAE.

SALPINGUS Illiger.

elongatus Mann. B. M. 1852.	R.
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RHINOSIMUS Latr.

aeneirostris Mann. B. M. 1853.	R.
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TANYRHINUS Mann.

singularis Mann. B. M. 1852.	R.
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CURCULIONIDAE.

BRUCHUS Linn.

pauperculus Lec. (infra)	Cal.
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RHYNCHITES Herbst.

bicolor Herbst. cum. var.	Cal. Or.
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Attelabus bicolor Fabr.

Glastinus Lec. (infra)	Cal.
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APION Herbst.

cuprescens Mann.	R.
crassinasum Lec. (infra)	Or. Cal.
proclive Lec. (infra)	Cal.
troglydites Mann.	Cal.
cribricollis, Lec. (infra)	Cal.
cavifrons Lec. (infra)	Or.
protensum Lec. (infra)	Cal.

SITONES Germ.

californicus Schönh.	Or. Cal.
seniculus Mann.	Cal.
vittatus Lec. (infra)	Cal.
sordidus Lec. (infra)	Cal.

TRIGONOSCUA Motsch.

pilosa Motsch.	Cal.
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ALOPHUS Schönh.

constrictus Lec. (infra)	Or.
alternatus † Mann. B. M. 1843	R.
seriatus Mann. B. M. 1853.	R.
didymus Lec. (infra)	Or.

LIOPHLOEUS Germ.

inquinatus Mann. B. M. 1852	R.
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LEPIDOPHORUS Kirby.

lineaticollis Kirby	R.
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LISTRODERES Schönh.

teretirostris Lec. (infra)	Cal.
oregonensis Lec. (infra.)	

HYLOBIUS Germ.

? taeniatus Lec. (infra)	Or.
? torpidus Lec. (infra)	Or.

LEPYRUS Germ.

gemellus Kirby Mann. B. M. 1853.	R.
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LEPOSOMA Motsch.

californicum Motsch.	Cal.
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TRACHYPHLOEUS Germ.

? incomptus † Lec.	Cal.
? squalens † Lec.	Cal.
? dilatatus † Lec.	Cal.

PTOCHUS Schönh.

saccatus Lec. (infra)	Or.
globiventris Lec. (infra)	Cal.

OTIORHYNCHUS Germ.

segnis Lec. (infra)	Or. Cal.
? naso Lec. (infra)	Or.

TYLODERES Sch.	
gemmatus <i>Lec.</i> (infra)	Or.
EMPHYASTES Mann.	
fucicola <i>Mann.</i> B. M. 1852 (infra)	R. Cal.
PHYTONOMUS Schönh.	
seriatus <i>Mann.</i> B. M. 1852	' R.
PLINTHUS Germ.	
carinatus <i>Schönh.</i>	R. Or.
<i>Heilipus scrobiculatus</i> Mann.	
LIXUS Fabr.	
auctus <i>Lec.</i> (infra)	Or.
poricollis <i>Mann.</i>	' Cal.
modestus <i>Mann.</i>	' Cal.
PISSODES Germ.	
costatus <i>Mann.</i>	R. Or.
MAGDALINUS Germ.	
imbellis <i>Lec.</i> (infra)	Or.
gracilis <i>Lec.</i> (infra)	Cal.
ERIRHINUS Schönh.	
morio <i>Mann.</i> B. M. 1853	R.
rufulus <i>Mann.</i> ibid.	R.
luridus <i>Mann.</i> ibid.	' R.
subsignatus <i>Mann.</i> ibid.	' R.
vestitus <i>Mann.</i> ibid.	' R.
BALANINUS Germ.	
uniformis <i>Lec.</i> (infra)	
ANTHONOMUS Germ.	
brunnipennis <i>Mann.</i>	' Cal.
TRACHODES Germ.	
ptinoides <i>Germ.</i>	R.
horridus <i>Mann.</i> B. M. 1852	R.
quadrituberculatus <i>Mann.</i> ibid.	R.
<i>Sthereus 4-tuberculatus</i> Motsch.	
CENTRINUS Schönh.	
confusus <i>Say.</i> Mann. B. M. 1843	' Cal.
BARIDIUS Schönh.	
macer <i>Lec.</i> (infra)	Cal.
seriatus <i>Lec.</i> (infra)	Cal.
CEUTORHYNCHUS Schüppel.	
pusio <i>Mann.</i> B. M. 1852	R.
ANALCIS Schönh.	
morbillosus <i>Lec.</i> (infra)	Cal.
RHYNCOPHORUS Schönh.	
asperulus <i>Lec.</i> (infra)	Cal.
SPHENOPHORUS Sch.	
discolor <i>Mann.</i>	Cal.
subcarinatus <i>Mann.</i>	Cal.

gentilis <i>Lec.</i> (infra)	Cal.
SITOPHILUS Schönh.	
oryzae <i>Schönh.</i> (mercat. allatus)	R. Cal.
<i>Curculio oryzae</i> Linn.	
COSSONUS Clairv.	
piniphilus <i>Schönh.</i>	' Cal.
RHYNCOLUS Creutzer.	
brunneus <i>Mann.</i>	R.
HYLASTES Er.	
rugipennis <i>Mann.</i> B. M. 1852.	R.
<i>Hylurgus rugipennis</i> Mann.	
nigrinus <i>Mann.</i> B. M. 1852.	R. Or.
<i>Hylurgus nigrinus</i> Man. ibid.	
pumilus <i>Mann.</i> B. M. 1852.	R.
<i>Hylurgus pumilus</i> Mann.	
subcostulatus <i>Mann.</i> B. M. 1853.	R.
cristatus <i>Mann.</i> B. M. 1853.	R.
HYLURGUS Latr.	
rufipennis <i>Kirby,</i> Mann. B. M. 1853.	' R.
obesus <i>Mann.</i>	' R.
DENDROCTONUS Er.	
valens <i>Lec.</i> , (infra)	Cal.
similis <i>Lec.</i> , (infra)	Or.
HYLESINUS Fabr.	
sericeus <i>Mann.</i> B. M. 1852.	' R.
<i>Hylurgus sericeus</i> Mann.	
rufipennis <i>Mann.</i> B. M. 1853.	' R.
<i>Apate (Lepisomus) rufipennis</i> Kirby.	
POLYGRAPHUS Er.	
saginatulus <i>Mann.</i> B. M. 1853.	' R.
XYLOTERUS Er.	
bivittatus <i>Mann.</i> B. M. 1853.	' R.
<i>Apate bivittata</i> Kirby.	
cavifrons <i>Mann.</i> B. M. 1852.	' R.
<i>Bostrichus cavifrons</i> Mann.	
BOSTRICHUS Fabr.	
interruptus <i>Mann.</i> B. M. 1852.	' R.
tridens <i>Mann.</i> ibid.	' R.
concinus <i>Mann.</i> ibid.	R.
semicastaneus <i>Mann.</i> ibid.	' R.
septentrionis <i>Mann.</i>	' R.
terminalis <i>Mann.</i>	Cal.
affaber <i>Mann.</i> B. M. 1852.	' R.
nitidulus <i>Mann.</i> B. M. 1852.	' R.
pubipennis <i>Lec.</i> , (infra)	Cal.
CRYPTHALUS Er.	
striatulus <i>Mann.</i> B. M. 1853.	' R.
CORTHYLUS Er.	
scutellaris, <i>Lec.</i> , (infra)	Cal.

CERAMBYCIDAE.

SPONDYLIS Fabr.

upiformis Mann. R. Or. Cal.

ERGATES Serv.

spiculatus Lec. Proc. Acad. Nat. Sc. 7, 218, (infra) --Or. Cal.
Trichocnemis spiculatus Lec.

PRIONUS Fabr.

californicus Motsch. R. Or. Cal.
crassicornis Lec.

ASEMUM Serv.

atrum Esch. Or. Cal.
 moestum Hald. Mann. B. M. 1853. 'R.
 asperum Lec., (infra) Or.

CRIOCEPHALUS Muls.

productus Lec. Or.

OPSIMUS.

quadri-lineatus Mann., (infra) R. Or.

TETROPIUM Kirby.

cinnamopterum Kirby, Mann. B. M. 1853, (var.?) -R. Or. Cal.

SEMANOTUS Muls.

Proteus Lec. 'R.
callidium Proteus Kirby, Mann. B. M. 1853.
 amethystinus Lec. Proc. Acad. Nat. Sc. 6, 234. Cal.
 ligneus Lec., (mercat. illatus) Cal.
Callidium ligneum Fabr.

CALLIDIUM Fabr.

aeneum Lec., (infra) Or.
 Mannerheimii Lec., (infra) R. Or.
dimidiatum || Mann.
 varium Fabr., (mercat. illatum) Cal.
 vulneratum Lec., (infra) Cal.
 decussatum Lec., (infra) Cal.
 antennatum Newm. Cal.
 cicatricosum Mann. B. M. 1853 R.

CROSSIDIUS Lec.

?hirtipes Lec. Pr. Acad. 7, 18 (infra) Or.

ROSALIA Serv.

funebis Motsch. (infra) R. Or.

OENEMONA Newm.

pulverulenta Motsch. Et. Ent. 1852, 76 'Cal.
Plagithmysus pulverulentus Motsch.

CLYTUS Fabr.

undulatus Say. Or.
Sayi Lap.
 undatus Kirby.
 nauticus Mann. Or. Cal.
 gramineus Hald.
 coniunctus Lec. (infra) Cal.

ULOGHAETES Lec.

leoninus Lec. Proc. Acad. Nat. Sc. 7, 82 (infra) Or.

DESMOCERUS Serv.

auripennis Chev. Rev. et Mag. de Zool. April, 1855 Or.

RHAGIUM Fabr.

investigator Mann. B. M. 1852 R. Or.
 inquisitor Fabr. (mercat. illatus?) 'R.

ACMAEOPS Lec.

coriaceus Lec. Pr. Acad. 7, 219 (infra) Or.

Piodes coriacea Lec.

fuscus Lec. (infra) Cal.
 lugens Lec. (infra) Cal.
 californicus Lec. Cal.
 ater Lec. Or.
 subcyanea Lec. (infra) Cal.
 subaeneus Lec. Cal.
 tumida Lec. (infra) Cal.
 marginalis Lec. Or.
 subpilosus Lec. Or.
 militaris Lec. Or.

TOXOTUS Serv.

flavolimbatus Lec. Proc. Acad. 7, 18 (infra) Or.
 spurcus Lec. (infra) Or.
 vestitus Hald. Or. Cal.

LEPTURA Linn.

(† STRANGALIA Serv.)

obliterata Lec. Or.
 vitiosa Lec. (infra) Or.
 impura Lec. (infra) Cal.
 molybdica Lec. Cal.
 amabilis Lec. (infra) Or.
 laeta Lec. (infra) Or. Cal.
 instabilis Lec. Or.
Pachyta instabilis Hald.
 convexa Lec. Or.
 vexatrix Mann. (Pachyta) B. M. 1853 'R.
 fulvipennis Mann. (Pachyta) B. M. 1853 'R.

(†† LEPTURA Serv.)

valida Lec. (infra) Or.
 subargentata Kirby Mann. B. M. 1853 'R.
 crassipes Lec. (infra) Or.
 fuscicollis Lec. (infra) Cal.
 Frankenhaueri Lec. R.
Anoplodera Frankenh. Mann. B. M. 1853.
 macilenta Lec. R.
Anoplodera macilenta Mann. B. M. 1853.
 ?liturata Kirby (Pachyta) Mann. B. M. 1852 'R.
 militaris || Chev. Rev. et Mag. de Zool. April 1855 Or.

PLECTURA Mann.

spinicauda Mann. B. M. 1852 'R.
 producta Lec. Pr. Acad. Nat. Sc. 7, 19 (infra) Or.

MONOHAMMUS Latr.

scutellatus Hald. Mann. B. M. 1853 R. Or.

TETRAOPES Dalman.	
oregonensis Lec. Pr. Acad. Nat. Sc. 7, 19 (infra)	Or.
basalis Lec.	Cal.
SAPERDA Fabr.	
One species in coll. exp. of Capt. Wilkes	Or.
MESOSA Serv.	
Guexi Lec. (infra)	Cal.
CHRYSOMELINAE.	
DONACIA Fabr.	
Germari, Mann.	R.
flavipennis Mann.	R.
pyritosa Lec. (infra)	Or.
SYNETA Esch.	
carinata Mann.	R. Or.
albida Lec. (infra)	Or.
simplex Lec. (infra)	Or.
SAXINIS Lec.	
saucia Lec. (infra)	Or. Cal.
CHLAMYS Knoch.	
conspersa Mann.	Cal.
rugulosa Motsch.	Cal.
CRYPTOCEPHALUS Fabr.	
sanguinicollis Suffr. Linn. Ent. 7, 78	Cal.
chalconatus Mann.	Cal.
PACHYBRACHYS Suffr.	
signatifrons Mann.	Cal.
melanostictus Suffr. Linn. Ent. 7, 191	Cal.
hybridus Suffr. ibid. 7, 157	Cal.
viduatus Suffr.	Or.
<i>Cryptocephalus viduatus</i> Fabr.	
<i>Cryptocephalus bivittatus</i> Say.	
EUMOLPUS Kugellan.	
vitis Fabr. Mann. (Bromius) B. M. 1853	R.
PACHNEPHORUS Redt.	
smaragdulus Lec. (infra)	Cal.
CHRYSOCHUS Redt.	
cobaltinus Lec. (infra)	Or. Cal.
TIMARCHA Redt.	
intricata Hald. Proc. Acad. Nat. Sc. 6, 363	Or. Cal.
intertexta Hald. (var.) ibid.	
CHRYSOMELA Linn.	
Bigsbyana Kirby	Or.
subsulcata Motsch.	R.
vidua Rogers. Proc. Acad. Nat. Sc. 8	Or.
scripta Fabr.	Or.
confluens Rogers. Proc. Acad. Nat. Sc. 8	Or.
lapponica Linn. Mann. (Lina.) B. M. 1853	R.
viminalis Linn. Mann. (Gonioctena) B. M. 1853	R.
arctica Rogers. Proc. Acad. 8	R.

<i>Gonioctena arctica</i> , Mann. B. M. 1853.	
<i>Gonioctena affinis</i> ‡ Mann. ibid. 1852.	
californica Rogers. Proc. Acad. Nat. Sc. 8	Cal.
caesia Rogers. Proc. Acad. Nat. Sc. 8	Cal.
interstitialis Mann. (Phratora) B. M. 1853	R.
HALTICA Fabr.	
maritima Lec.	Cal.
<i>Disonycha maritima</i> Mann.	
puncticollis Lec. (infra)	Or. Cal.
limbicollis Lec. (infra)	Cal.
californica Lec.	Cal.
<i>Graptodera californica</i> Mann.	
prasina Lec. (infra)	Cal.
plicipennis Lec.	Or. Cal.
<i>Graptodera plicipennis</i> Mann.	
obolina Lec. (infra)	Cal.
lazulina Lec. (infra)	Or.
tombacina Mann. B. M. 1853	R.
cerina Lec. (infra)	Cal.
subglobosa Lec.	Cal.
<i>Aphthoma subglobosa</i> Motsch.	
aereola Lec. (infra)	Cal.
subcrinita Lec. (infra)	Cal.
ligata Lec. (infra)	Cal.
subaenea Lec. (infra)	Cal.
albionica Lec. (infra)	Cal.
lepidula Lec. (infra)	Cal.
LONGITARSUS Latr.	
californicus Motsch. (Thyamis)	Cal.
PSYLLIODES Latr.	
parvicollis Lec., (infra)	Cal.
convexior Lec., (infra)	Cal.
CHAETOCNEMA Stephens.	
irregularis Lec., (infra)	Cal.
DIABROTICA.	
duodecim-punctata, var.	Cal.
<i>Galleruca 12-punctata</i> Fabr.	
vittata, var.	Cal.
<i>Galleruca vittata</i> Fabr.	
<i>Diabrotica trivittata</i> Mann.	
LUPERUS Geoffr.	
varipes Lec., (infra)	Cal.
longulus Lec., (infra)	Or.
GALLERUCA Geoffr.	
rudis Lec., (infra)	Or.
punctipennis Mann.	Cal.
luctuosa Mann. B. M. 1852.	R.
conspua Lec., (infra)	Cal.
guttulata Lec., (infra)	Cal.
morosa Lec., (infra)	Cal.
canadensis Kirby, var.?	Or.
flavolimbata Mann.	Cal.
MICRORHOPALA.	
vittata.	Or.

- Hispa vittata* Fabr.
rubrolineata Mann. (Odontota) ----- Cal.
- CASSIDA Linn.
nobilis Linn. Mann. B. M. 1853, (mercat. illata?) ----- 'R.
novem-maculata Mann. ----- Cal.
aurisplendens Mann., (Coptocycla) ----- 'Cal.
- COCCINELLIDAE.
- ANISOSTICTA Redt.
vittigera Lec. ----- Or. Cal.
Hippodamia vittigera Mann.
Naemia vittigera Muls.
- HIPPODAMIA Muls.
tredecim-punctata Muls. Mann. B. M. 1853. ----- 'R.
Coccinella 13-punctata Linn.
ambigua Lec. Proc. Acad. 6, 131. ----- Or. Cal.
punctulata Lec. ibid. ----- Cal.
extensa Muls. ----- 'Cal.
sinuata Muls. ----- 'Cal.
parenthesis Lec. Mann., (Adonia) B. M. 1853. ----- 'R.
Coccinella parenthesis Say.
Coccinella tridens Kirby.
Hippodamia lunatamaculata Motsch.
Adonia parenthesis Muls.
moesta Lec. Pr. Acad. 7, 19. ----- Or.
- COCCINELLA Linn.
12-maculata Gebl. Mann., (Harmonia,) B. M. 1853. ----- 'R.
incarnata Kirby.
trifasciata Linn. Mann. B. M. 1853. ----- 'R.
transverso-guttata Fald. Mann. B. M. 1853. ----- 'R.
- 5-notata Kirby.
monticola Muls. ----- Or.
Menetriesi Muls. ----- 'Cal.
californica Mann. ----- Cal.
subversa Lec. Proc. Acad. 7, 19. ----- Or.
abdominalis Say. ----- Cal.
- MYZIA Muls.
Rathvoni Lec. Proc. Acad. 6, 132. ----- Cal.
subvittata Muls. ----- 'Cal.?
- PSYLLOBORA Muls.
taedata Lec., (infra) ----- Cal.
- CHILOCORUS Leach.
fraternus Lec., (infra) ----- Cal.
- HYPERASPIS Redt.
annexa Lec. Proc. Acad. Nat. Sc. 6, 133. ----- Cal.
quadrioculata Muls. ----- Cal.
Exochomus quadrioculatus Motsch.
- SCYMNUS Kug.
guttulatus Lec. Proc. Acad. Nat. Sc. 6, 136. ----- Cal.
pallens Lec. ibid. 137. ----- Cal.
debilis Lec. ibid. ----- Cal.
marginicollis Mann. ----- Cal.
- SACIUM Lec.
decolor Lec. Proc. Acad. 6, 145. ----- Cal.
- ENDOMYCHIDAE.
- EPIPOCUS.
laetus Lec. Proc. Acad. ----- Cal.

DESCRIPTION OF GENERA AND SPECIES.

OMUS Esch.

O. Dejeanii, aeneo-ater, opacus, thorace latitudine brevior, trapezoides, depresso, profunde intricato-rugoso, ad apicem striato, elytris punctatis subrugosis, foveisque profundis irregulariter impressis. Long. .7—.8. Tab. I, Fig. 1.

Reiche, Annales de la Soc. Entom. France, 7,297; Tab. 10, Fig. 1.

Fort Vancouver, Dr. J. G. Cooper; Steilacoom, Dr. Suckley.

O. californicus, ater subopacus, thorace latitudine haud brevior, trapezoides, modice convexo, profundissime intricato-rugoso, elytris profunde punctatis, punctis vix inaequalibus. Long. .6. Tab. I, Fig. 3.

Eschscholtz, Zool. Atlas, 5, 4; Tab. 4, Fig. 1: Reiche, Ann. Ent. Soc. Fr. 7,301; Tab. 10, Fig. 3. (copied): Mann. Bull. Mosc. 1843, 182.

San Francisco; found by me in February, floating in pools of water; a female was liberally presented to me by Mr. J. Ph. Wild.

O. Audouinii, ater, subopacus, thorace latitudine non brevior, trapezoides, modice convexo, intricato-rugoso, minus profunde in disco, margine apicali sublaevi, elytris subrugosis, punctatis, punctisque maioribus dispersis impressis. Long. .55—.7. Tab. I, Fig. 2.

Reiche, Annales de la Soc. Entom. France, 7,297; Tab. 10, Fig. 2.

Oregon, at Fort Vancouver, Dr. Cooper. Only males were procured, but for a female, collected by the late J. K. Townsend, M.D., I am indebted to Dr. T. W. Harris.

These three species, the only ones known, form two natural divisions, according as the thorax is short and depressed, (*O. Dejeanii*), or oblong and moderately convex. The two species of the latter division resemble each other closely in form, size, and sculpture, the less deeply rugous thorax of *O. Audouinii* at once distinguishes it; the head of that species is also less deeply rugous between the eyes than in *O. californicus*; the elytra are more distinctly rugous, and there is an obvious difference in the size of the punctures of the elytra; on close inspection, a similar character may be seen in *O. californicus*, but much less distinctly.

PRISTODACTYLA Dej.

P. lenis, piceo-nigra, subnitida, thorace subquadrato, postice paulo angustiore, lateribus rotundatis margine subreflexo, angulis posticis obtusis rotundatis, ad basin utrinque late foveato, elytris thorace latioribus, tenuiter striatis, bipunctatis, antennis pedibusque rufo-piceis; unguibus ad basin paulo serratis. Long. .44.

Anchomenus lenis Mann. Bull. Mosc. 1853.

Kadjak, Russian America; Baron Chaudoir. This species is closely allied to *P. advena* Lec., but is larger. The thorax is more narrowed behind, and the sides are less broadly reflexed. I was much surprised to find the unguis of this species finely serrate from the middle to the

base, believing that such a character could hardly escape the acute observer who described it, but much greater was my surprise to find the same character in *P. mollis*; on examining the tooth of the mentum, I found that it was bicuspid, as in other species of *Pristodactyla*, and I am now convinced that all species placed by authors in *Platynus*, (*Anchomenus* and *Agonum*), which have but two dorsal punctures on the elytra, must be removed to *Pristodactyla*.

AGAOSOMA Ménétriés.

A. californicum, valde elongatum, nigrum, nitidum, fronte profunde bifoveato, utrinque parce punctato, thorace latitudine plus duplo longiore, lateribus late rotundatis, utrinque angustato, sed postice angustiore, ad basin utrinque, et ante basin medio vage foveato, elytris thorace vix latioribus, ad basin truncatis; profunde striatis, interstitiis paulo convexis. Long. .69, Tab. I, Fig. 5.

Ménétriés, Bull. Acad., St. Petersburg, 1843, 63: Mann. *ibid.* 1845, 108.

Stenomorphus californicus Chaud. Bull. Mosc. 1844, 478.

Sacramento? California; a specimen collected by Mr. Woznessensky, the only person by whom it has been found, was sent me in exchange by Dr. Klug, of Berlin. On comparing with a Texan species of *Stenomorphus*, yet undescribed, I find that the differences in the posterior tibiae, to which attention was called by Mannerheim, exist in part, but hardly to the extent indicated in his comparison between this species and *S. angustatus* Dej. The rows of spines visible in *Stenomorphus* are replaced by stout hairs, but the deep grooves on the inner face of the hind tibiae are also present in the Texan species. In the one now under consideration, the anterior tibiae are internally fringed with long dense white hair, (Tab. — Fig. a,) while in *Stenomorphus* only a few scattered bristles can be seen. This difference, with that of the form, seems to indicate that the genus *Agaosoma* should be preserved, at least for the present.

STENOLOPHUS Dej.

S. limbalis, olivaceo-niger, aenescens, nitidus, thorace subquadrato, latitudine brevior, lateribus modice rotundatis, basi utrinque punctulato et late foveato, limbo toto anguste testaceo, elytri thorace paulo latioribus, apice sinuatis, striis sat profundis, postice profundioribus, interstitiis planis, tertio unipunctato, epipleuris, antennarum articulo 1mo, pedibus, coxisque anterioribus testaceis; palpis piceis apice testaceis. Long. .26.

Very abundant at San Jose, California. The anterior and middle tarsi of the male are dilated, and the last joint is deeply bilobed, as in *S. versicolor*, which this species closely resembles in form. The foveae of the thorax are broader, and the base more punctured; the posterior angles are much more distinct.

S. anceps, nigro-piceus, nitidus, thorace latitudine paulo brevior, subquadrato, lateribus rotundatis, postice subangustato, angulis posticis obtusis rotundatis, basi laevi utrinque late foveato, limbo toto rufo-testaceo, elytris cyaneo-micantibus, sutura margineque rufo-testaceis, thorace paulo latioribus, striis impunctatis, 2da unipunctata, ad apicem oblique subsinuatis, antennarum basi, pedibus coxisque testaceis. Long. .24.

San Francisco. Closely allied to *S. ochropezus*, but the thorax is less deeply foveate at the base, and not at all punctured; the striae of the elytra appear less deep.

S. tener, valde elongatus, depressus, piceus nitidus, thorace elytrorum margine et apice rufescentibus, illo subcordato, latitudine non brevior, postice angustato, lateribus subsinuatis, angulis posticis rectis, ad basin utrinque foveato, vix punctato, elytris thorace paulo latioribus, parallelis, ad apicem oblique subsinuatis, striis sat profundis, 2da unipunctata, antennarum basi, palpis pedibusque testaceis. Long. .16.

One specimen found at San Jose, California. Resembles in form *S. alternans* Lec.—(Trans. Am. Phil. Soc. 10, 386; Aepus et Badister testaceus Lec.)

S. californicus, niger, nitidus thorace subquadrato, latitudine paulo brevior, postice angustiore, lateribus rotundatis, angulis posticis obtusis vix rotundatis, ad basin punctulato utrinque subfoveato, elytris thorace latioribus, elongatis, parallelis ad apicem haud sinuatis, striis profundis, 3ia unipunctata, stria scutellari nulla; antennis piceis, palpis pedibusque flavis. Long. .10.

Found in every part of California. Belongs to the division of the genus which contains most of the North American species of *Acupalpus* described by Dejean; the tarsi of the male are hardly dilated.

PROMECOGNATHUS Chaud.

P. laevissimus, niger, nitidissimus, mandibulis porrectis, capite haud brevioribus, capite utrinque bistriato, thorace latitudine longiore, postice angustato, et lateribus subsinuato, angulis posticis subobtusis, ad basin marginato, et utrinque subfoveato, elytris thorace latioribus, ovalibus postice valde declivibus. Long. .43—.46. Tab. I, fig. 4.

Chaudoir, Bull. Mosc. 1846, 524.

Eripus laevissimus Dejean, Sp. Gén. 4, 11: Mann. Bull. Mosc. 1843, 210.

San Jose, California, on rocky hills, under stones. I have failed to perceive any relationship between this genus and *Stomis*, near which it is placed by Baron Chaudoir. By the form of the mentum and labrum, as well as by the structure of the antennae, it seems closely allied to *Pasimachus* and *Scarites*, although differing by the anterior tibiae, which are not palmate.

CYCHRUS Fabr.

C. tuberculatus, ater, opacus, capite valde rugose punctato, plano, lateribus subcarinatis, fronte late bisulcato, et medio elevato, thorace profunde confluentem punctato, ad apicem et basin truncato, postice angustato, angulis posticis obtusis, ad basin transversim impresso et utrinque foveato, elytris ventricosus, tuberculis parvis nitidis obsitis, tuberculisque maioribus serie triplici positus, quarum tuberculo intermedio postico maior. Long. .88. Tab. I, fig. 6.

Harris, Bost. Journ. Nat. Hist, 2, 200.

A specimen collected in Oregon by the late Dr. J. K. Townsend was given to me by Mr. Willcox.

CARABUS Linn.

C. taedatus, niger, thorace latitudine brevior, minus convexo, postice subangustato, lateribus antice rotundatis, pone medium anguste reflexis, angulis posticis modice productis ad apicem rotundatis, disco parcius lateribus et basi dense punctato et intricato-rugoso, elytris saepe piceo-purpureis, thorace sesqui latioribus, elongatis, subtiliter dense striolato-punctatis, foveisque magnis minus profundis, serie triplici impressis. Long. .92. Tab. I, fig. 7.

Fabr. Ent. Syst. emend. 1, 127; Syst. El. 1, 174: Oliv. Ins. 35. tab. 2, fig. 11; Enc. Méth. 5, 328.

Carabus baccivorus Fischer, Entom. 1, 87; tab. 7, fig. 11; 3, 221: Esch. Bull. Mosc. 6, 99: Dej. Spec. Gen. 2, 167.

Carabus seriatus Wiedemann, Germ. Magazin, 4, 109.

Russian America and Oregon, abundant. This species long ago described by Fabricius, probably from the collection of Captain Cook's voyage, has been lost sight of in modern times, or rather has been made known under other names; the insect described by Fabricius was in Sir Joseph Banks' collection, and the figure given by Olivier is quite recognizable.

C. oregonensis, cyaneo-niger, thorace fere opaco, latitudine vix brevior, minus convexo, utrinque angustato, lateribus rotundatis, angulis posticis modice productis, apice rotundatis, lateribus pone medium subreflexis, elytris thorace fere duplo latioribus, subtiliter striolato-punctatis, foveisque minus profundis serie triplici impressis. Long. .85.

Lec. Proc. Acad. Nat. Sc. 7, 16.

One male from Prairie Paso; Dr. Cooper. Closely related to *C. taedatus*, but the thorax is proportionally much smaller and narrower, and much more densely and finely rugose; the rugae of the head are also smaller, and the impressions less deep; the striae and foveae of the elytra are less deeply marked.

CALOSOMA Fabr.

C. calidum Fabr. A specimen collected at Steilacoom, by George Gibbs, esq., cannot, after much examination, be separated from this common species. It is rather narrower than any other specimen I have seen, and the coppery foveae of the elytra are larger and less numerous.

C. cancellatum, nigro-aeneum, crassiusculum, thorace latitudine plus duplo brevior, dense intricato-rugoso et punctato, basi utrinque late foveato, lateribus latius rotundatis pone medium modice reflexis, angulis posticis paulo productis rotundatis, elytris oblongis, thorace parum latioribus, saepe virescentibus, seriatim punctatis, transversim rugosis, foveisque aeneis serie triplici impressis, interstitiis catenatim paulo elevatis, tibiis intermediis rectis. Long. .8. Tab. I, fig. 8.

Eschscholtz, Zool. Atlas, 5, 23: Mann. Bull. Mosc. 1843.

Calosoma aenescens Lec. Proc. Acad. Nat. Sc. 7, 16.

Fort Vancouver, Dr. Cooper; Sacramento, California, Mr. Wittick. Shorter and less convex than *C. calidum*, approaching in form some species of *Callisthenes*; the thorax is hardly narrowed behind, and the posterior angles are distinctly, though broadly produced. The wings are well developed, and the other joints of the antennae are equally pubescent. The intervals between the rows of punctures of the elytra are marked with a few transverse striae; the spaces between the impressed foveae are distinctly elevated, and smoother than the other parts of the elytra.

The specimens collected by Dr. Cooper, in Oregon, differ from those found in California, by the less distinct green tinge of the elytra, which are also less densely rugous; on this account I was disposed to regard them as indicating a species different from that of Eschscholtz, but the subsequent receipt of two specimens from California, which, with many other valuable species, were presented to me by Mr. S. S. Rathvon, enables me now to pronounce these differences as

merely individual. One of the characters mentioned by Eschscholtz, that the spaces between the rows of punctures of the elytra are alternately more elevated, seems liable to variation: in one specimen it is seen; in another, the middle interval in each space between the catenated rows appears a little broader than those next the elevations; but in the other specimens no difference in breadth or elevation can be perceived.

C. discors, apterum, minus elongatum, nigrum, thorace brevi, valde intricato-rugoso, lateribus valde rotundatis, margine subdepresso, basi emarginato, medio truncato, elytris ovalibus thorace paulo latioribus, confertim substriatis, striis interstitiisque uniseriatim punctatis, foveisque obsoletis serie triplici impressis. Long. .75—.82. Tab. I, fig. 9.

San Francisco, Mr. Child; Sacramento, Mr. J. Wittick. This species, by its short robust form, and by the absence of wings, simulates *Callisthenes*, but the antennae are as in other species of *Calosoma*.

Body black, without metallic lustre. Head elongated, rough with confluent wrinkles and punctures; antennae with the third joint strongly compressed, twice as long as the fourth, fifth and following joints entirely pubescent. Thorax more than twice as wide as the head, and fully twice as wide as its length, not convex, margined, with the sides somewhat depressed behind, but not reflexed; base transversely impressed, and faintly bifoveate; middle part truncate, posterior angles moderately produced, hardly acute at apex. Elytra oval, moderately convex, a little wider than the thorax, marked with faint approximate striae, which are strongly punctured; the narrow interstices are also marked, each, with a row of punctures equal to those of the striae; in certain lights three rows of very indistinct foveae may be seen in the usual position.

NOTIOPHILUS Dumeril.

N. nitens, aeneus, fronte multistriato, thorace transverso, quadrato, postice vix angustato, toto subtiliter rugoso, limbo late punctulato, elytris stria scutellari duplici, suturali dorsali-que septem remotis subtilibus punctatis, (duabus externis fere oblitteratis,) externa ad apicem exarata, et cum suturali iuncta, interstitiis nitidis, tertio fovea ante medium duabusque versus apicem impresso, antennis basi testaceis. Long. .21.

One specimen, Prairie Paso, Oregon, Dr. Cooper. The punctures are much finer than in any of the species known to me from the Atlantic States, and the thorax is less narrowed towards the base. The striae are not impressed as in *N. sylvaticus*, but are merely rows of punctures.

TRACHYPACHYS Motsch.

T. inermis, nigro-aeneus, oblongo-ovalis, capite aequali, fronte lateribus marginato, thorace transverso, lateribus antice rotundatis, postice transversim impresso et uniseriatim punctato, utrinque profunde foveato, et extrorsum subcarinato, elytris seriatim punctatis, ad latera et apicem laevibus. Long. .2. Tab. — fig. 10. Motsch. Carab. Russl. p. 16, (note.)

Trachypachus Holmbergi, Mann. Bull. Mosc. 1853.

Two specimens, Shoalwater Bay, Oregon, Dr. Cooper. This interesting genus was founded upon *Blethisa Zetterstedtii* Gyll., a rare insect of northern Europe. From the rarity of this species, authors who have not had an opportunity of examination have much mistaken the characters of the genus. So far from being allied to *Blethisa*, it has the anterior acetabula

dehiscent, and the mesosternum at the tip compressed and carinate as in *Notiophilus*. From the latter genus it differs by the very short emarginate labrum, by the more distinct, but also bicuspid mentum-tooth, and by the less prolonged prosternum. Of the anterior tarsi of the male, the first and second joints are dilated; the third and fourth are small and equal.

AMPHIZOIDAE.

Coleoptera pentamera, pedibus ambulatoriis, antennis filiformibus; prothoracis episternis a noto sutura divisis, acetabulis anticis postice hientibus; coxis anticis et mediis globosis, posticis transversis ad marginem corporis extensis, contiguis, antice truncatis, postice ad insertionem pedum elevatis; mento magno emarginato, cum gula omnino connato, (sutura nulla;) maxillis lobo interno curvato acuto, intus parce spinoso, galea elongata palpiformi exarticulata; abdomine sex-articulato, articulis anterioribus tribus connatis.

In the above diagnosis I have placed an assemblage of characters which seem fully to justify the establishment of a separate family for the reception of the very remarkable *Amphizoa insolens*. A detailed description may be found in the 6th volume of the Proceedings of the Academy of Natural Sciences of Philadelphia, (p. 227;) I there express the opinion that it would not enter any family of Adephaga as then constituted, and brief allusion was made to the large size of the posterior coxae, which cut off all connexion between the metathorax and the ventral abdominal segments, as indicating an affinity with the Dytiscidae, a view which, also, seemed to be confirmed by the subglabrous antennae; at the same time the ambulatorial legs showed a tendency towards the Carabidae. Since there appeared to be, however, no very strong resemblance in the structure of the legs, though ambulatorial, with those of *Carabus*, I did not insist very strongly on the latter affinity.

Lacordaire has, in the excellent work now being published by him on the Genera of Coleoptera, (Vol. 1, p. 409,) introduced an abstract of the description given by me, but not considering the characters sufficiently important to define a new family, has placed the genus as a tribe of Dytiscidae, equal in value to *Pelobius*. A misunderstanding of some expression used by me has, unfortunately, led him to place in the diagnosis of the tribe, 'hanches posterieures . . .

. . . non contigues au côté interne;' which is not the case; the coxae come together on the median line, as in *Pelobius*, *Dytiscus*, &c., but differ in the anterior margin being transverse and rectilinear, while in all true Dytiscidae (*Haliplus* and *Cnemidotus* being excluded) the anterior outline is rounded; the posterior lobes above the insertion of the hind feet are more distant and less elevated. The second ventral segment is prolonged anteriorly in an obtuse angle, and articulates with the coxae, so that the first segment is entirely lateral, as in Carabidae. From this it results that no part of the metathorax reaches the ventral segments of the abdomen, all communication being cut off by the coxae extending to the sides of the body.

Another character not found in any other Adephagous insect, is the complete union without any visible suture between the gula and mentum; this fact is of great importance, and upon it the argument for the separation of this as a new family must to a considerable extent rest. I regret that it was omitted in my former description, although observed while making a re-examination for the present report; to Dr. Schaum, also, I owe my acknowledgments for a

very interesting letter on *Amphizoa*, in which my attention was called to this omission, and to the misstatement that the galea of the maxillae is biarticulate; a more careful view shows that it is in reality undivided, and that I was deceived by a cross reflection of light.

With regard to the affinities towards the *Tenebrionidae*, upon which Dr. Schaum lays great stress, I confess that I have failed to appreciate them; the sculpture of the femora and tibiae are, indeed, similar to that of *Tentyria*, but the joints of the tarsi are puffed out below, and not concave, with a marginal series of short spines, as in *Tentyria* and *Carabidae*. The anterior coxae are entire in all *Tenebrionidae*, while in *Amphizoa* they are open; the posterior coxae are also entirely different in form and position from all *Tenebrionidae* known to me.

The antennae, as observed by Dr. Schaum, though nearly glabrous, are not those of a *Dytiscus*, but still less are they those of a *Tenebrionite*; still it must be admitted that the homogeneous structure of the outer articulations, without any lateral spongy portion resembles more nearly what is seen in *Dytiscidae*, than in any other family of *Coleoptera*.

To conclude then this portion of the essay, I would briefly state, that the anomalous structure of *Amphizoa* is such as to exclude it absolutely from any known family, and that its position must be in a new family, between *Carabidae* and *Dytiscidae*, without any distinct point of osculation with either; *Pelobius* on the one hand, and *Opisthius* on the other being the nearest allies.

As these conclusions are much at variance with those deduced by others, I take the liberty of transcribing a portion of Dr. Schaum's letter, with a view to hasten as far as possible the time of harmonizing the diverse results, which are always obtained in a case of such difficulty.

"*Amphizoa* has, indeed, the posterior coxae of *Pelobius*, but there seems to be a greater difference between its coxae and those of the typical *Dytisci* than between its coxae and those of *Ozaena*, for instance. This is, however, the only character which I can find to agree with any *Dytiscus*. The antennae are glabrous, but they are the antennae of a *Heteromeros* insect, and not those of a *Dytiscus*. All the other characters seem to me to be at variance with the water beetles; configuration of prosternum, metasternum, legs, number of visible abdominal segments, and above all the parts of the mouth! * * * The legs are also different from the type of the *Carabidae*; they are glabrous and the joints are perfectly those of *Tentyria*. Even the dilatation of the coxae is found in the *Heteromeros* tribe. But what now is this most anomalous insect? In my opinion a most extraordinary *Carabus* with many characters of the *Heteromera*. In spite of the exarticulated exterior lobe (of the maxillae) it must be referred to the *Adephaga* on account of its mentum, the number of united abdominal segments, and the number of tarsal joints. I prefer much more to put it among the *Carabi* than among the *Dytisci*, on account of the constricted thorax, the sternal segments, the number of abdominal segments, the texture and structure of maxillae, and the ambulatorial legs. The analogies to the *Heteromera* are most striking; antennae, legs, even the coxae are those of *Tentyria*. It is interesting that this form occurs in California, where the *Heteromeros* type is so prevalent."

Having now laid both opinions before the reader, I leave the subject to the consideration of systematists, illustrated by the excellent figures made by Mr. Hitchcock of the various parts of the under surface, Pl. I, fig. 11, *a* and *b*, the antennae 11 *c*, anterior leg 11 *d*, and posterior leg 11 *e*.

AMPHIZOA Lec.

Antennae 11-articulatae filiformes glabrae, articulis internis punctatis; palpi breves articulis

cylindricis; prosternum postice productum rotundatum, mesosternum antice carinatum declive, postice late excavatum; tarsi articulo ultimo elongato, subtus ad apicem utrinque emarginato, et medio rotundatim producto (sicut in Carabis,) postici articulo primo secundo sesqui longiore, omnibus subtus convexis, pubescentibus haud setosis; unguiculi simplices.

A. insolens, atra, opaca, subvirescens, glabra, thorace scabro, canaliculato, antrorsum angustato lateribus suberratis, ad medium subangulatis, postice subangustato, angulis posticis acutis elytris ovalibus, substriatis, scabro-punctatis, thorace duplo latioribus. Long. 52°. Tab. —, fig. 11.

Lec. Proc. Acad. Nat. Sc. 6, 288.

Sacramento? California; collected by J. Child, esq, and given me by Mr. S. S. Rathvon. Color dull black, tinged with greenish, without lustre. Head irregularly rugous and punctulate, with two shallow impressions between the antennae. Labrum covering the obtuse mandibles, slightly and broadly biemarginate in front. Thorax twice as wide as the head, flat, scabrous, sides subserrate, strongly narrowed from the middle to the apex, slightly narrowed and subsinuate behind; base very broadly bisinuate, posterior angles acute; disc channelled, with a shallow impression each side at the base, and a broad transverse one before the middle. Elytra broadly oval, slightly convex, nearly twice as wide as the thorax, scarcely one half longer than wide, scabrous with shallow punctures, striate with nine slightly impressed grooves, which appear coarsely and indistinctly punctured. Scutellum flat, broad, acute at apex. Under surface of the body covered with shallow confluent punctures and wrinkles. Legs scabrous with fine elevated punctures. No sexual difference was observed between five specimens.

AGABUS Leach.

A. brevicollis, obtuse ovalis minus convexus, totus niger vix aenescens, (mas alutaceus, femina subtiliter reticulata,) thorace latitudine triplo brevior antrorsum valde angustato, lateribus late rotundatis cum elytris angulum haud formantibus, his seriebus solitis punctorum minus distinctis. Long. 35—44.

Upper Sacramento river; Mr. Child. Resembles in form *A. stagninus*, but is very different in its color and other characters. The punctures of the elytra are less numerous than usual, and the rows become indistinct towards the tip—not by being confused, but from the roughness of the surface.

ACILIUS Leach.

A. latiusculus, ovalis minus convexus, supra piceo flavoque irroratus, capite thoraceque maculis solitis flavis, elytris (feminæ) punctulatis, limbo fasciaeque postica irregulari flavis, sulcis utrinque quatuor exaratis, primo brevior, alterisque ad basin haud extensis, subtus cum pedibus testaceis, suturis fuscis. Long. 52; lat. 31.

One specimen from the Upper Sacramento; Mr. Child. This species is broader than *A. fraternus*, and the outer furrows of the elytra are a little longer; the pale color of the under surface will at once distinguish it from that species, and from *A. simplex* Lec., found in southern California. *A. abbreviatus* Mann., which was found by Dr. Cooper at Fort Vancouver, is testaceous beneath, but the form of body is still narrower than in *A. fraternus*.

DYTISCUS Linn.

D. sublimbatus, elongato-ovalis, postice vix latior, supra nigro-piceus, thorace latitudine triplo brevior, lateribus subrotundatis late testaceis, linea angusta subapicali alteraque minus

distincta basali medio latiore signato, elytris testaceo-marginatis pone medium versus marginem longitudinaliter leviter impressis, lineis solitis punctatis distinctis; subtus cum pedibus testaceus, suturis abdominisque lateribus fuscis; coxarum posticarum laciniis brevibus valde divergentibus rotundatis. Long. 1.03.

One male, Prairie Paso; Dr. Cooper. Narrower and less convex than usual, and thus resembling in form *D. conformis*, perplexus, &c., of Europe. The thoracic basal yellow margin is slender, it bends forwards half way between the basal angle and the scutel, and is then continued across parallel with the base, forming the outline of such a mark as is seen in *D. anxius*; the basal edge and the scutel are reddish-yellow; the line at the apex touches the margin only towards the angles; in the middle it is bounded by the line of punctures; the sides converge anteriorly, and are very broadly but regularly rounded. The elytra are very thickly punctulate, except towards the base, where they become almost smooth; the submarginal longitudinal impression extends from the middle half way to the tip, but it is not well defined; the subapical yellow band, usually seen on the elytra, is entirely wanting.

NECROPHORUS Fabr.

N. pollinator, niger, thorace ovali transverso, marginibus late depressis, disco tenuiter canaliculato, fortius transversim impresso, elytris parcius punctatis, macula latterali ad medium in epipleuram extensa, alteraque parva lunata ante apicem rubris; pectore flavo-pubescente; abdomine breviter griseo-ciliato, tibiis posticis rectis. Long. .58.

Lec. Proc. Acad. Nat. Sc. 7, 19.

Collected by Dr. Cooper, on the journey from Fort Vancouver to Yokolt Plains. Resembles in the form of the thorax, *N. sexpustulatus*, but the impressions are deeper. The margin is punctured; the disc in one specimen is smooth, in another, obsoletely punctulate. The antennæ are entirely black. I have not changed the name of this species, since *N. pollinator* Mann. appears merely a slight variation of *N. maritimus*.

THINOPINUS Lec.

T. pictus, testaceus vel pallidus, capite thoraceque nitidissimis hoc fascia interoculari ad latera postice flexa ochroleuca nigro-variegato, thorace postice subangustato, macula utrinque maxima annulari postice interrupto nigra, elytris obsolete strigosis, annulo lato nigro ad humerum interrupto signatis, thorace duplo brevioribus, abdomine supra bifariam nigro-signato. Long. .55—.75, Tab. I, Fig. 12.

Lec. Ann. Lyc. Nat. Hist. of New York, 5, 216.

Trichocanthus variegatus, Motsch. Etudes Entom., 1852, p. 78; Mann. Bull. Mosc., 1853.

Found on the sea coast of California, as far south as San Diego; on the wet sand below high water mark, on the open ocean shore; also found in Russian America, according to Motschulsky. The very short elytra, which overlap each other at the suture, as in *Xantholinus*, and the absence of wings, renders this very distinct from every other genus of the tribe of genuine staphylinidæ.

HISTER Linn.

H. sellatus, oblongo-ovalis convexus niger nitidus, thorace latitudine duplo breviori bistriato, interstitio antice punctis paucis notato, lateribus et apice longe flavo-ciliatis, elytris rubris,

margine apicali maculaque communi scutellari nigris, striis utrinque tribus externis integris, reliquis oblitteratis; tibiis anticis bidentatis, posticis seriebus transversis extrorsum spinulosis. Long. .25.

One specimen from San Francisco, given me by Mr. Wild. Smaller and narrower than *H. arcuatus*, to which it is allied. The thighs are entirely black, and the posterior tibiae are more compressed. The sutural stria is entirely wanting, and the epipleurae are marked with a single lateral stria; the pygidium is equably and coarsely punctured.

SAPRINUS Leach.

S. estriatus, oblongo-rotundatus, aeneo-niger, thorace confertissime aciculato, callo utrinque rotundato, spatioque basali sublaevibus, elytris confertissime aciculatis striis dorsalibus nullis, macula pone basin subsuturali altera humerali tertiaeque intermedia minore nitidis laevibus, stria externa elongata flexuosa parum distincta. Long. .13.

One specimen from Oregon, collected by Dr. Townsend. This species belongs with *S. fraternus*, *mancus*, *bigemmeus*, &c., to group 8 of my division of the genus, (Proc. Acad. Nat. Sc. 6,) in which the front is transversely margined and angularly impressed, and the prosternum compressed with the striae distinct. The anterior tibiae were probably four-toothed, as in *S. bigemmeus*, but the teeth, with the exception of one at the middle are entirely worn off.

TERETRIUS Er.

T. obliquulus, oblongus, cylindricus, niger nitidus punctatus, elytris striola obliqua ad basin versus humeros impressis; antennarum clava, pedibusque piceo-rufis, tibiis anticis subito dilatatis, sexdenticulatis. Long. .13.

Sacramento; Mr. Wittick. This species resembles in form *T. picipes*, but is considerably larger, being fully twice as long; that species is more finely punctured, and has no oblique stria at the base of the elytra.

EPURAEA Er.

E. nubila, elongato-ovalis, testacea, punctulato-rugosa, subtiliter flavo-pubescent, thorace antrosum angustato, lateribus rotundatis depressis, angulis posticis subrectis, elytris anguste marginatis, macula utrinque ad medium nigro-picea ornatis, ad apicem singulatim rotundato-truncatis. Long. .10.

One specimen, San José, California. This species is a little wider than *E. parallela* Lec., but is narrower than usual; the thorax is about twice as wide as its length; the base is broadly rounded in the middle, and slightly sinuate towards the basal angles, so that the latter become nearly rectangular, and not rounded. The elytra are about one-half longer than wide.

OMOSITA Er.

O. inversa, nigra, opaca, subtiliter griseo-pubescent, confertim subtilius punctata, thorace piceo-rufa, latitudine plus duplo brevior, antrosum magis angustato, lateribus rotundatis late depressis, disco canaliculato et utrinque subfoveato, elytris testaceis, macula utrinque basali,

punctoque ad medium, maculisque pluribus ad marginem et pone medium nigris confluentibus variegatis, apice coniunctim rotundatis. Long. .13.

San José, California. Larger than *O. colon*, and distinguished by distinctly channelled and less convex thorax, by the greater number of the dark spots of the elytra being behind the middle, while in *O. colon* the reverse is the case.

MELIGETHES Steph.

M. rufimanus, ovalis, virescenti niger subnitidus, dense subtilius punctatus, breviter cinereo-pubescent, thorace lateribus antice rotundatis, angulis posticis obtusis tibiis anticis rufis paulo dilatatis extrorsum serrulatis, posterioribus dilatatis dense spinulosis. Long. .09—.10.

San José, California, on the flowers of *Ranunculus*. The thorax is nearly twice as wide as long; the sides are almost parallel behind the middle, but converge anteriorly, and are considerably rounded; the elytra are broadly rounded at tip, and are one-half longer than their width.

M. moerens, ovalis, nigro-virescent, subnitidus dense subtilius punctatus, tenuiter griseo-pubescent, thorace lateribus rotundatis angulis posticis obtusis, tibiis anticis minus dilatatis, ad basin subtilissime, ad apicem distinctius crenulatis, posterioribus dilatatis extrorsum dense spinulosis. Long. .10.

Oregon. Very similar to *M. rufimanus*, but differs in the sides of the thorax being more rounded, with the posterior angles more obtuse; the anterior tibiæ are narrower, and the crenulation towards the base becomes so fine as to be hardly visible.

M. seminulum, ovalis convexior, niger nitidus, thorace sat dense subtilius punctato, tenuiter marginato, latitudine plus duplo brevior, lateribus rotundatis, angulis posticis obtusis, elytri subtilius sat dense punctatis, tibiis omnibus modice dilatatis, anticis versus apicem subtiliter crenulatis posterioribus extrorsum spinulosis. Long. .08.

Oregon, one specimen. The pubescence has probably been removed by the alcohol in which the specimen was preserved. Smaller and more convex than the others, and the margin of the thorax is narrower; the thorax itself is wider and more rounded on the sides. The anterior tibiæ at the base appears smooth.

AMPHICYRTA Er.

A. chrysomelina, aptera, longius ovata, antice angustior piceo-aenea, nitida convexa, dense subtiliter punctulata, tarsis piceis, tibiis anticis extrorsum obtuse angulatis. Long. .35. Tab. —, fig. 14.

Erichson, Germ. Zeitschr. 4, 40; Lec. Proc. Acad. Nat. Sc. 7, 116.

Oregon: collected by the late Dr. J. K. Townsend, and given me by Mr. Edwin Willcox.

CREMASTOCHILUS Knoch.

C. angularis, ater opacus, breviter setosus, thorace confertim punctato, lateribus antice rotundatis, postice obliquis, angulis anticis foveatis acutis, posticis productis elevatis acutis, impressione obliqua definitis, elytris punctis minus profundis ellipticis; mento concavo postice acuminato. Long. .5.

One specimen from Sacramento, collected by Mr. Wittick. This, in form, size, and general

appearance, resembles *C. canaliculatus*, but the mentum is of a different form, and on comparison many other differences may be seen. From *C. Schaumii*, Lec. (Proc. Acad. Nat. Sc. 6, 231) it differs by the smaller size, less rounded sides, but more acute angles of the thorax, and by the posterior angles being separated by a small but deep oblique impression; near the margin of the elytra may be seen a few whitish tranverse undulated lines.

TRYSSUS Er.

T? comatus, nitidus, capite obscuro, confluentem punctato, clypeo concavo rotundato, fortiter marginato, thorace luteo-ferrugineo, marginibus longissime flavo-pilosis, lateribus valde rotundatis, angulis anticis acutis, confertim punctato, versus latera utrinque foveato, elytris piceo-testaceis, ad marginem flavo-pilosis, obsolete punctatis, stria suturali profunde exarata, propygidio dense punctato, pubescente, pygidio parce piloso et punctulato, nitido: subtus ferrugineus, femoribus et pectore longe pilosis, abdomine glabro, articulo sexto postice parce fimbriato. Long. .68.

One specimen, Sacramento, Mr. Wittick. This is the first appearance of the group Macrophyllidae in America; it differs from the genuine Melolonthidae by the segments of the abdomen being separate, with distinct sutures. On account of the 9-jointed antennae with three jointed club, I have referred it to a genus constructed by Erichson (Ins. Deutchl.) for some South African species; the unguis is cleft, (as required by his description,) each division being broad and acute, the inferior one is a little short; the tarsi are longer than the tibiae, and the last joint is armed with a small tooth beneath, near the tip. The labrum is large and emarginate, and the epimera of the metathorax are broad.

DIPLLOTAXIS Kirby.

D. brevicollis, ferrugineo-picea, oblonga nitida, capite confertim punctato, sutura frontali distincta, clypeo late emarginato, margine anguste reflexo, thorace latitudine triplo brevior, punctato, antrosum angustato, antice transversim impresso, ad angulos posticos foveatim excavato elytris serie suturali, quatuor per paria approximatis, quinqueque externis punctatis, interstitiis inter paria et suturam disperse punctatis; pygidio grosse punctato. Long. .45.

Steilacoom, Washington Territory; George Gibbs, esq. One specimen.

D. subangulata, oblonga, nigra nitida, clypeo confertim punctato marginato, lateribus obliquis ad apicem late truncato, thorace sub-hexagono, sat punctato, latitudine plus sesqui brevior antice angustior, lateribus medio obtuse angulatis et rotundatis, angulis posticis obtusis vix rotundatis, elytris oblongis thorace latioribus, punctis minus subtilibus seriatim digestis (seriebus internis confusis); pygidio confluentem grosse punctato. Long. .34.

Oregon. Similar in appearance to many others, but readily known by the characters given.

DICHELONYCHA Kirby.

D. valida, elongata, nigro picea, supra parce subtus densius albopubescens, thorace brevi hexagono, inaequaliter grosse punctato vage impresso, modice canaliculato, elytris confertim rugose punctatis, fusco aeneis viridi tinctis, margine, antennis pedibusque testaceis. Long. .55.

One specimen; San Francisco, Mr. Child. Larger than any other species known to me. The New Mexican *D. sulcata*, Lec., (report of Captain Pope's expedition,) has the thorax

unequally punctured, but the impressions and dorsal channel in that species are much deeper, while the elevated spaces are almost smooth.

D. fulgida, elongata, rufo-picea, cinero pubescens, thorace pube subflava densius vertito, punctato subcanaliculato, latitudine sesqui brevior, antrorsum angustato, lateribus rotundatis, pone medium sinuatis, postice parum angustato, angulis posticis prominulis, elytris thorace paulo latioribus rugose punctatis, lineis duabus solitis parum distinctis, viridiæneis, epipleuris rufo-piceis, pedibus testaceis, tibiis tarsisque obscuris. Long. .37.

Steilacoom; Dr. Suckley. A little broader than *D. elongata*, and having the thorax formed as in *D. testacea* and *Backii*, from which it differs in color.

CERYLON Latr.

C. simplex, castaneum nitidum, elongatum minus depressum, thorace latitudine paulo longiore, lateribus postice parallelis, antice rotundatis, sat dense punctato, elytris striis punctatis fortiter impressis, interstitiis subconvexis. Long. .10.

San José, California. The elytra are regularly although slightly convex transversely, and not at all flattened on the disc, as in *C. castaneum* and *unicolor*. The intervals between the striae are somewhat convex, very finely and sparsely punctulate. The thorax is without discoidal impressions, and even the basal ones are hardly perceptible.

ATOMARIA Kirby.

A. laetula, oblonga, nigra, convexa, nitida, minus dense punctata, parce albo-pubescens, thorace convexo, rufo, antrorsum angustato, ad basin late rotundato et transversim impresso, elytris convexis, rufis, fascia lata nigro-picea ad medium ornatis, antennis pedibusque rufo-testaceis. Long. .06.

Variates supra nigra, elytrorum apice late rufo-testaceo.

San José, California. Belongs to the second division of Erichson (Ins. Deutsch. 385,) having the antennae more distant from each other than from the eyes; near the European *A. unifasciata*, from which it differs by the less dense punctuation.

PEDILOPHORUS Steffahn.

P. acuminatus, ovatus apterus, convexus, utrinque attenuatus, supra aeneus nitidus, cinereo-pubescens, thorace subtilius, elytris parcius punctatis; subtus niger fortius punctatus cinereo-pubescens, tarsis piceis articulis tertio longe lobato. Long. .16.

Morychus acuminatus, Mann. Bull. Mosc., 1852, 341.

Sitkha, Baron Chaudoir. Much broader than the next species, and gradually narrowed each way from the base of the elytra; the latter are more sparsely punctured, and the pubescence, though not dense, is coarser.

P. oblongus, oblongo-ovalis, apterus, antice subacutus, convexus aeneus nitidus, subtilius cinereo-pubescens, thorace subtiliter, elytris distinctius punctatis; subtus niger, fortius punctatus, cinereo-pubescens, tarsis piceis articulo tertio longe lobato. Long. .18.

Pedilophorus acuminatus † Lec. Proc. Acad. Nat. Sc. 7, 115.

Oregon. The body is acutely narrowed from the base of the thorax forwards; the thorax is a little more finely punctured than the elytra; the latter are nearly parallel on the sides, and obtusely rounded behind.

SERICA McLeay.

S. anthracina, ovata, nigra fere opaca, cyaneo-micans, clypeo punctato, valde marginato, lateribus fere parallelis, ad apicem late emarginato, thorace brevi confertim punctato, antrorsum valde angustato, lateribus rotundatis, elytris striatis, punctatis, ad apicem late truncatis. Long. .25—.35.

Oregon, Dr. Townsend and Col. McCall; San Francisco, Mr. Child; Sacramento, Mr. Wittick. The small specimen is reddish brown, but is perhaps immature.

CAMPTORHINA Kirby.

C. serotina, oblonga, obscure ferruginea, capite punctato, margine reflexo, antico late biemarginato; thorace subtiliter punctato, linea dorsali fere laevi, convexo, lateribus valde rotundato, elytris leviter sulcatis, sulcis confertim punctatis, interstitiis punctis paucis notatis, pygidio confertim punctato. Long. .42.

One specimen, Sacramento, collected by Mr. Wittick. Of the size and form of *C. vespertina* Lec. (*Serica vespertina* Schönh. *Camptorhina atricapilla* Kirby,) but with the thorax finely punctured, and the elytra less sulcate and less coarsely punctured.

HOPLIA Illiger.

H. irrorata, oblonga, nigra, squamulis griseis setisque intermixtis vestita, clypeo antice truncato, thorace antrorsum angustato, lateribus valde rotundato pygidio abdomineque densius squamosis, tibiis anticis bidentatis, tarsis anterioribus unguiculis fassis, interiore duplo brevior. Long. .28.

Oregon, Dr. Townsend; California, Mr. Child. The antennae are 9-jointed. The elytra are sometimes reddish brown.

PLEOCOMA Lec.¹

P. fimbriata, latiuscula, ovalis, parum convexa, nigra, nitida supra glabra, capite inter cornua excavato laevi, occipite subtiliter rugose punctato, thorace latitudine fere triplo brevior, antrorsum valde angustato, lateribus rotundatis, parce punctulato, antice modice declivi, elytris stria suturali, alterisque 8 per paria approximatis punctatis parum distinctis, interstitiis sat dense punctatis; ad marginem et subtus, dense et longe flavo-villosa. Long. 1.05. Tab. I, fig. 13, (antenna 13a.)

Mas capite antice in capite furcato protenso, vertice breviter cornuto. Lec. Proc. Acad. Nat. Sc. 8.

Antennae (maris) 11-articulatae, articulo 3io elongato, 4to intus, ad basin producto, 6-11 laminatis, clavam heptaphyllam formantibus. Maxillae et mandibulae invisae, minutae.

On the eve of my departure from the country, perfect specimens of this most curious genus have arrived, but do not, in the hasty manner in which I am obliged to study them, throw much light upon its affinities. Although agreeing with Geotrupidae in the eleven-jointed antennae, the form of the antennae is entirely anomalous in that and allied groups, and the small size of the oral organs would seem to indicate a new group between Geotrupidae and Copridae.

These specimens are much smaller than the other one, being only .8 of an inch long. The figure is made from the one first obtained, but the antennae are supplied from the smaller specimens, those of the former being very imperfect, though still sufficiently preserved to be correctly described in the text, having only four long leaves, and one short one in the club. These differences may be sexual, at least no adequate specific difference on comparison, unless it be in the thorax, which, in the large specimen, is very finely and sparsely punctured, while in the small ones it is quite densely punctured and clothed sparsely with long hairs like those on the margin.

One specimen, California, Dr. Heermann; given me by Mr. Haldeman. As the oral organs and the abdomen are destroyed, I cannot tell whether this genus belongs to the Dynastides or Geotrapides; in either case the four-jointed antennae club is equally remarkable. The affinities, as far as I can understand them, seem to be rather with Geotrupes.

CANTHON Illiger.

C. simplex, latiusculus, minus convexus, niger alutaceus opacus, thorace lateribus integerimis, medio angulatis, disco parce subtiliter punctato, elytris parce subtilius punctatis, striis obsoletis vix impressis; clypeo antice reflexo, sexdentato, dentibus mediis magnis, lateralibus parvis; pedibus anticis in fossulis haud receptis. Long. .22—.36.

Oregon and California. Resembles in appearance *C. nigricornis*, but the elytra are less narrowed behind. The small tubercle, which interrupts the margin of the thorax on the under surface before the middle in the other species, is here entirely wanting, and the under surface is hardly excavated for the reception of the anterior feet.

APHODIUS Illiger.

A. pectoralis, oblongus convexus, niger nitidus, capite subtiliter punctulato, quadri-tuberculato, clypeo tenuiter marginato, lateribus obliquis ante late truncato, thorace punctulato et disperse punctato, ante medium subangustato, et lateribus modice rotundato, ad basin late rotundato et subtiliter marginato, angulis posticis obtusis, elytrorum striis crenulatis, interstitiis subplanis, vix obsoletissime punctulatis; mesosterno alutaceo, ad medium striolato. Long. .21.

One specimen, San Francisco. The terminal fringe of the hind tibiae is formed of spines equal in length, and the species belongs to the same division (G. of Erichson, Ins. Deutschl. 814,) as *A. congregatus* and *ursinus*; the only representative in the Atlantic States is the introduced *A. foetidus* Fabr. (*tenellus* Say.) The tubercles of the head are very distinct, the anterior one is a small transverse carina, and the three posterior ones are connected by an indistinct elevated line.

A. rubidus, oblongus ferrugineus, nitidus, clypeo antice bicuspi, medio late emarginato, laevi, thorace antrorsum subangustato, lateribus rotundatis, angulis posticio valde rotundatis, disco parcius punctato, punctulis vagis intermixtis, elytris striis profundis crenulatis, interstitiis vage punctulatis. Long. .28—.32.

San Francisco, not common. Resembles *A. laevigatus*, and belongs to the same division of the genus; the clypeus is more emarginate, and the angles are subacute; the thorax is distinctly narrowed in front and punctured as in *A. oblongus*; the striae of the elytra are more finely crenulate than in either.

A. pardalis, niger oblongus, clypeo testaceo-nebuloso punctulato, antice vix late emarginato, thorace lateribus cum angulis rotundatis, subtilius vage punctato, punctisque maioribus intermixtis, lateribus late testaceis; elytris testaceis nigro variegatis, striis fortiter punctatis, interstitiis paulo convexis, obsolete vage punctulatis, pedibus flavis. Long. .16.

San Francisco. Resembles *A. serval* Say; the clypeus of the male has three posterior tubercles and a slight anterior transverse elevation.

A. subaeneus, oblongus, aeneo-niger, nitidus, clypeo subtiliter punctato, late emarginato, thorace subtiliter punctato lateribus, antice rotundatis pone medium parallelis, angulis omnibus

rotundatis, elytris striis subtiliter punctulatis, interstitiis planissimis obsolete punctulatis, 2^{ndo} (et 3^{io}, 4^{to}que saepe ad basin) margine basali apicalique tetaceis; pedibus piceis. Long. .16.

San Francisco. The spines of the apical fringe of the posterior tibiae are somewhat unequal in size. The clypeus is not tuberculate in either sex.

AEGIALIA Latr.

Ae. crassa, ovata, crassa, convexa, nigra nitida, subtus flavo-setosa, clypeo scabro, thorace punctato, apice laevi, lateribus valde rotundatis vage impressis, elytris striis punctatis, interstitiis parum convexis laevibus. Long. .17.

San Francisco. The thorax is very short and much narrowed in front, less punctured on the sides than in the middle; the general form is that of *Trachyscelis*.

Ae. caelata, ovata convexa, nigra nitida, subtus flavo-setosa, clypeo valde scabro, thorace brevi lateribus valde rotundatis, fovea media sulcisque duabus transversis interruptis grosse punctatis (posteriore profunda), elytris inflatis, striis profundis fortiter crenatis interstitiis parum convexis laevibus, subtus pedibusque piceis. Long. .13.

San Francisco, abundant. The impressions of the thorax are very coarsely punctured, the elevated parts are smooth; the apical coriaceous margin is testaceous, varies with the elytra, and feet rufous.

SINODENDRON Fabr.

S. rugosum, piceo-nigrum nitidum, thorace grosse, elytris confluentem foveatim punctatis vix obsolete striatis. Long. .48—.55.

Mas capite punctato, cornu elongato antice protenso, superne parce ciliato paulo concavo, armato; thorace ad medium antice subito declive, transversim carinato, denteque medio armato; parte anteriore concavo, dense punctato. Tab. I, fig. 15.

Femina capite rugose punctato tuberculo frontali munito, thorace aequaliter grosse punctato, convexo linea dorsali antice abbreviata et elevata, calloque utrinque parum elevato sublaevibus, ad apicem transversim impresso.

Mann. Bull. Mosc., 1843.

California, sent me by Colonel Motschulsky.

ANCYLOCHIRA Esch.

A. Gibbsii, viridiaenea, elongata, capite purpurascens punctato, fronte carinato, thorace latitudine sesqui brevior, punctato, lateribus subparallelis, basi bisinuata, elytris purpureis, macula magna obliqua antica (puncto humerali aeneo includente), macula transversa postica suturam haud attingente, alteraque ante apicem rufo-flavis, striis profundis punctatis, interstitiis parce punctatis ad apicem emarginatis bidentatis, labro antennisque testaceis, his articulo primo aenescens. Long. .6. Tab. I, fig. 17.

One specimen, collected at Steilacoom, by Mr. George Gibbs, to whom I dedicate it with much pleasure. The second spot of the elytra is situated about one-third from the apex, and extends from the margin nearly to the suture; the posterior one is near the apex, it also extends nearly to the suture, but is dilated along the margin.

A. Langii, laete viridiaenea, vel cupreo-aenea, capite confertim punctato, thorace latitudine brevior antrosum sensim angustato, subcanaliculato, versus latera foveato, confertim punctato,

minus dense pone medium; elytris striis profundis punctatis, interstitiis convexis parce punctatis et rugulosis, (macula obliqua parva lobata palide flava), pone medium saepe ornatis; antennis obscure cupreis; elytris ad apicem vel truncatis vel subbidentatis. Long. .68—.77. Tab. I, fig. 16.

Buprestis Langii Mann. Bull. Soc. Imp. Nat. Mosc., 1843.

Oregon, Dr. Cooper, at Shoalwater Bay; Steilacoom, Mr. Gibbs. Of this species I have seen three specimens; one is bright copper colored; the second is green, with the elytra immaculate; the third is bright green with an oblique yellow lobate spot behind the middle of each elytron; the apex in one is truncate, in the others slightly bidentate.

A. laeviventris, nigro-aenea, subtus nitidior, abdomine vix obsolete punctato, lateribus parce albo-pilosis, segmento ultimo macula utrinque transversa sanguinea notato; thorace latitudine haud brevior, antrorsum angustato, lateribus rectis, angulis omnibus subacutis, disco sat grosse punctato, linea longitudinali plagisque utrinque duabus sublaevibus; elytris minus nitidis, sulcato, striatis, macula trilobata utrinque prope basin ultra medium extensa, alteraque ad dodrantem transversa fulvis ornatis. Long. .78.

Northern California, Mr. Child. Allied to *A. Nuttalli*, but is narrower; the thorax is longer and the punctures of the abdomen are very indistinct. The anterior spot extends from near the base for two-thirds the length of the elytra, and is composed of three confluent spots, each of which is sub-triangular. Specimens will probably occur in which these spots are not united.

A. adjuncta, supra splendide viridiaenea, dense punctata, crassiuscula, thorace latitudine fere triplo brevior, antrorsum angustato, lateribus late rotundatis cuprascentibus, late canaliculato, elytris sutura anguste, margine late cupreis, costis utrinque quatuor scutellarique cum sutura elevata confluyente laevibus nitidis, costa altera subsuturali fere integra adjuncta, interstitiis dense punctatis, ad apicem subemarginatis. Long. .6.

Lec. Proc. Acad. Nat. Sc., 7, 17.

One specimen found by Dr. Cooper, on the journey from Fort Vancouver to Yokolt Plain, in July. This species is allied to the two next, as well as to *A. aurulenta* and *striata*, but differs from them all by having obsolete costae between the ordinary ones, and by having an additional costa extending nearly from base to apex between the first dorsal and the suture. The head is glabrous, and uniformly punctured; the under surface is bright coppery, tinged with green, moderately punctured; the prosternum is broadly impressed between the coxae, and is not hairy.

A. lauta, supra splendide viridiaenea, dense punctata, fronte fere glabro non concavo, thorace latitudine plus duplo brevior, antrorsum angustato, lateribus late rotundatis cuprascentibus, late canaliculato, elytris sutura anguste margine late cupreis, costis quatuor alteraque scutellari cum sutura elevata confluyente laevibus nitidis, interstitiis dense granulato-punctatis, ad apicem vix truncatis. Long. .58—.75.

Lec. Proc. Acad. Nat. Sc., 7, 17.

Abundant in Oregon, whence it has been brought in every collection made. Resembles the brilliant variety of *A. striata*, but is distinguished by its more robust form, and by the impunctured costae of the elytra; varieties occur, having a broad blue vitta extending from the first to the third costa. The body beneath is coppery, somewhat hairy, and the prosternum is impressed between the coxae; the front is marked with a very narrow nearly smooth medial line.

A. radians, supra splendide viridiaurea, dense punctata, fronte concavo longe albo-piloso, thorace latitudine vix duplo brevior, antrorsum angustato, lateribus late subrotundatis cuprascentibus, disco late canaliculato, elytris sutura margineque cupreis, costis quatuor scutellarique cum sutura elevata confluyente nitidis laevibus, interstitiis dense granulato punctatis, ad apicem subtruncatis. Long. .6.

Lec. Proc. Acad. Nat. Sc., 7, 17.

One specimen, Fort Vancouver, Dr. Cooper. Perhaps, not distinct from *A. lauta*, but the body is narrower, being of the form of *A. striata*; from the latter it differs by the concave and pilose front; the pectus is as in the preceding, but is densely clothed with long white hair; the under surface is coppery golden, more densely punctured than in *A. lauta*.

BUPRESTIS Linn.

B. angulicollis, aenea, depressa, capite excavato, canaliculato, grosse cicatricoso, thorace latitudine brevior, lateribus postice parallelis, ante medium angulatis, inaequali, versus angulos posticos late excavato, punctato, partibus elevatis costaque dorsali lata elevatis nitidis, elytris sutura, costisque solitis elevatis, secunda late tridilatata, et callo basali instructa, quarta brevior tenui postice late dilatata, partibus elevatis laevigatis nitidis, impressionibus punctatissimis, lateribus haud serratis. Long. 1.13.

Sacramento, Mr. Wittick. Larger than *B. virginica*, in which also the sides of the thorax are sometimes angulated, but never to such an extent as in this species; the dilatations of the second and third elevated lines of the elytra are much wider.

MELANOPHILA Esch.

M. consputa, elongata depressa, atra opaca, capite rugose punctato, thorace tenuiter canaliculato, disco subtiliter transversim rugoso, lateribus punctato et lineis elevatis aciculato, angulis posticis longius carinatis, elytris postice oblique angustatis confertim granulato-punctatis, guttis utrinque quatuor obscure croceis ornatis; subtus aeneo-nigra.—Long. .47.

Northern California, Mr. Child. This species has nearly the form of our common *M. longipes*, but is a little narrower; the tips of the elytra are separately rounded and not at all acuminate. The spots on each elytron are arranged; one a little before the middle, one-third from the suture; another just behind the middle, one-third from the margin; then, two on a transverse line, one-third from the apex; they, therefore, form, with those of the opposite side, a figure rounded anteriorly, with a straight posterior outline.

ANTHAXIA Esch.

A. expansa, lata depressa, atra, opaca vix aenescens, thorace latitudine duplo brevior, lateribus, valde rotundatis depressis, reticulatim punctato, elytris thorace haud latioribus, confertim granulato-punctatis, fortius marginatis, postice suboblique attenuatis ad apicem rotundatis, ad basin elevato-marginatis.—Long. .28.

Oregon and California. Resembles a species found in New Mexico, which I consider as *A. aeneogaster* Lap., but is still broader, with the sides of the thorax more rounded, and the posterior angles more obtuse. The base is not truncate as in most Anthaxiae, but is slightly obtuse at the middle; this character, with the sculpture of the thorax and elytra, indicates a passage towards Melanophila.

DICERCA Esch.

D. pectorosa, supra obscure fusco-aenea, capite inaequali grosse punctato, thorace latitudine plus duplo brevior, valde canaliculato, fere bicostato, (costis laevibus), ad latera inaequali, grosse confluentem punctato, lateribus valde rotundato-dilatatis, postice breviter sinuatis, angulis posticis acutis, elytris thorace angustioribus lateribus parallelis, postice prolongatis integris, foveatim striato-punctatis, rugosis, interstitiis dense punctatis, spatiis parvis irregularibus nitidis parum elevatis, praecipue versus scutellum notatis. Long. .64.

Oregon, Dr. Suckley. Somewhat similar to *D. tenebrosa*, but the thorax is much more dilated, and the smooth spaces of the elytra are not distinct, and are irregularly connected. The terminal segment of the abdomen is truncate, strongly bicostate, with four deep subapical foveae. The under surface is dark brassy, with large rugous punctures of a brighter color.

D. crassicollis, supra obscure cinereo-aenea, capite inaequali grosse punctato thorace latitudine plus duplo brevior, fere quadricostato, costis exterioribus interruptis, utrinque late excavato, lateribus valde dilatatis, postice longius sinuatis, angulis posticis paulo acutis; elytris thorace haud latioribus, humeris rotundatis lateribus subparallelis, postice breviter caudatis et subbidentatis, grosse indistincte striato-punctatis, interstitiis densissime punctatis, alternatim plagis oblongis elevatis laevibus ornatis. Long. .66.

Steilacoom, Dr Suckley. The elytra are sculptured exactly as in *D. tenebrosa*, but the rows of punctures are less obvious; the posterior prolongation is shorter, and slightly bidentate; the thorax is much more dilated on the sides, and more deeply excavated; in one specimen a small callus is seen in the middle of the dorsal channel. The terminal ventral segment of the male is rounded, but in the female has two acute narrow incisures.

POLYCESTA Esch.

P. californica, nigro-aenea, elongata, capite grosse confluentem cribrato, haud excavato, thorace brevissimo antrorsum angustato, lateribus obtuse angulatis, angulis posticis obtusis haud rotundatis, inaequaliter cribrato, vage tricanaliculato, canalis externis antice abbreviatis, ante scutellum linea brevi longitudinali impresso; elytris margine basali, costisque quatuor elevatis, interstitiis confertim punctatis et biseriatim grosse punctatis lateribus antice late rotundatis, dein parallelis, humeris obtusis. Long. .75.

Sacramento, Mr. Wittick, one specimen. This species much resembles a larger one found in Texas and a smaller one from Alabama; but from each it is distinguished by the front not being concave and by the more regularly and densely punctured spaces between the costae of the elytra; the series of punctures adjacent to the costae are smaller and more regular; the three inner costae are smooth, while the external one is punctured; the tips of the elytra are broken, some of the small teeth of the lateral serration yet remain.

PEROTHOPS Esch.

P. Witticki, piceus, undique fusco sericeus, confertissime punctulatus, vertice transversim profunde excavato, thorace latitudine duplo brevior, canaliculato valde convexo, ad basin declivi, antrorsum valde angustato, lateribus valde rotundatis, elytris striatis interstitiis paulo convexis. Long. .82. Tab. I, fig. 18.

Sacramento, Mr. Wittick. In form this species resembles *P. mucidus*, but the pubescence is brownish gray and more sericeous. The thorax is more convex; and the deep transverse impression between the eyes is very different from the vague rounded one seen in *P. mucidus*. The discovery of a second species of this curious genus is of great interest, and it gives me pleasure in naming it to commemorate the disinterested services of the gentleman by whom it was collected.

ATHOUS Esch.

A. scissus, ater nitidus, tenuissime pubescens, thorace latitudine longiore, confertim punctato, lateribus fere rectis parallelis modice reflexo-marginatis, angulis anticis oblique truncatis; elytris profunde striato punctatis, interstitiis parce punctatis, antennarum articulo 3io triangulari quarto paulo brevioribus; tarsis haud lobatis. Long. .58.

One specimen, Oregon, Dr. Cooper. Smaller and a little narrower than *A. reflexus* Lec. (Trans. Am. Phil. Soc. 10, 427,) but nearly allied to it.

LIMONIUS Esch.

L. ornatulus aeneo-niger, griseo-pubescens, clypeo late emarginato vix concavo, thorace confertim punctato, latitudine longiore, antrosum paulo angustato, lateribus late rotundatis elytris striis bene impressis punctatis, interstitiis punctatis parum convexis, macula utrinque oblonga basali suturaque fulvis, pedibus piceis, tibiis testaceis; antennis nigris, articulis 2 et 3io aequalibus 4to coniunctis haud longioribus. Long. .2.

San Francisco, Mr. Child, one specimen. This species belongs to the division in which the lateral suture of the prosternum is excavated anteriorly. It may be placed in the vicinity of *L. basillaris*, Lec., (Trans. Am. Phil. Soc. 10, 431,) though the legs are only in part testaceous. The posterior angles of the thorax are rectangular and slightly testaceous.

CORYMBITES Latr. (emend. Lec.)

C. Suckleyi, niger glaber, nitidus longiusculus, thorace latitudine longiore, lateribus late rotundatis, ante medium subangustato, angulis posticis vix divericatis, antice dense, postice in medio obsolete punctato, pone medium canaliculato; elytris thorace haud latioribus, fortius marginatis, subtiliter rugosis striis tenuibus punctatis, interstitiis paulo convexis parce punctatis, macula elongata marginali ante medium intus curvata, et ad suturam fere extensa, alteraque transversa lunata ad dodrantem ornatis; scutello dilatato griseo-piloso; antennis articulo 3io haud dilatato, 4to sequente vix maiore. Long. .53.

Steilacoom, George Gibbs, esq., one specimen. It affords me much pleasure to dedicate this beautiful species to Dr. Suckley, my esteemed friend, who, by his active and scientific zeal, has added so many new objects to the fauna of the regions explored by him.

Although resembling in many characters, as well as by its form, *C. aratus*, Lec., (Trans. Am. Phil. Soc. 10, 438,) this species seems, from its dilated scutel and glabrous body, to indicate a new section of the genus, to be placed between the first and second established by me.

C. festivus, crassiusculus, vix tenuiter pubescens, niger, thorace quadrato, modice convexo, lateribus antice rotundatis, angulis posticis paulo divaricatis, confertim punctato sanguineo, vitta lata dorsali, margine laterali prosternoque nigris; elytris testaceis, sutura (antice latiore,)

macula elongata a humero fere ad medium extensa, fasciæ postice concava pone medium nigris, strigæ postica submarginali fusca ornatis striis profunde punctatis, interstitiis parce punctulatis; abdominis lateribus sanguineis, pedibus ferrugineis, antennis fuscis, articulis tribus baseos ferrugineis. Long. .53.

One specimen, Steilacoom, George Gibbs, esq. Nearly related to *E. cruciatus* of Europe and to *C. pulcher* Lec., (Trans. Am. Phil. Soc. 10, 440,) but sufficiently distinct by the foregoing characters. The red margin of the abdomen is gradually widened behind, so that the last joint is red with a large basal black spot; each segment is also margined with red; the anterior lobe of the prosternum is partly red, and the black extends beyond the prosternum upon the pleuræ, which are thus red with black margins, as in *C. pulcher*.

AGRIOTES Esch. (emend. Lec.)

A. macer, valde elongatus, ater opacus pubescens, thorace latitudine sesqui longiore, lateribus parallelis, antice paulo rotundatis, confertim punctato, transversim minus convexo, elytris striis punctatis, interstitiis sat dense punctatis, antennis articulis 2do et 3io coniunctis 4to aequalibus. Long. .32.

Shoalwater Bay, Dr. Cooper. Very closely resembles *A. oblongicollis*, (*Dolopius oblongicollis* Mels.,) but the thorax is less convex transversely, and the feet are black.

ELATER Linn. (emend. Esch.)

E. rhodopus, ater breviter griseo-pubescens, thorace confertim punctato, postice subcanaliculato, elytris striis vix impressis punctatis, interstitiis confertim rugose punctulatis, pedibus antennisque ferrugineis, his articulo 3io secundo fere duplo longiore. Long. .45.

Steilacoom, George Gibbs, esq., one specimen. Of the same form as *E. luctuosus*, Lec., (Trans. Am. Phil. Soc. 10, 466,) but differs from that, as from all the species there described, by the less deep elytral striæ, which, towards the tips, are represented only by rows of punctures.

E. caprella, elongatus, ater cinereo-pubescens, thorace latitudine longiore, antrorsum angustato, lateribus antice rotundatis, sat dense punctato vix canaliculato; elytris macula basali, altera angulata ante medium, tertiaque rotundata ad dodrantem flavis, striis punctatis, interstitiis planis rugose punctatis, antennis articulis 2do et 3io aequalibus, pedibus testaceis. Long. .25.

Shoalwater Bay, Dr. Cooper. Very similar to *E. stigmatus* Lec., (Trans. Am. Phil. Soc. 10, 472,) but the striæ of the elytra are not so deep, and the basal spot is not connected with the angulated spot, which rises along the suture nearly to the scutellum; the posterior spot is larger and more rounded; the thorax is more distinctly narrowed anteriorly. Varieties were found in which the basal and angulated spots are obsolete, or even entirely wanting.

ADELOCERA Latr.

A. aurorata. A specimen found at Steilacoom by Mr. Gibbs agrees in every respect with the description made by me from the typical specimen found in New Hampshire by Dr. Harris; as I have not a specimen in my collection, I cannot assure myself of their identity by a direct comparison.

ELLYCHNIA Lec.

E. facula, elongato-elliptica, atra tenuiter pubescens, thorace latitudine vix brevior disco convexiusculo, lateribus et apice concavis reflexis punctatis, macula submarginali lunata rosea ornato, elytris dense punctulatis, linea unica dorsali obsoleta utrinque notata. Long. .52.

Prairie Paso, Dr. Cooper, one specimen. Differs from *E. corrusca* by its less dilated form and longer thorax, and by the elytra having only one obsolete line.

TELEPHORUS Geoffr.

T. larvalis, flavo-testaceus, subtilissime pubescens, thorace glabro nitido, latitudine longiore, lateribus parallelis, angulis posticis haud rotundatis, disco antice ad latera excavato, medio late canaliculato, pone medium sub-binodoso, elytris substriatis scabris, antennis ad apicem fuscis, articulis 2ndo et 3io aequalibus. Long. .31.

Shoalwater Bay, Dr. Cooper, one specimen. Resembles *T. longulus* Lec. (Proc. Acad. Nat. Sc. 5, 343,) but the thorax is not narrowed, the excavations are larger and deeper, and the second joint of the antennae is not shorter than the third.

ENOPLIUM Fabr.

E. dichroum, elongatum laete rubrum, pube erecta nigra vestitum, thorace latitudine longiore, convexo, lateribus antice parallelis, postice angulatis, angulis anticis rotundatis, posticis obtusis, parce punctato, obsolete transversim biimpresso, medio breviter canaliculato, ad basin fortiter marginato; elytris thorace parum latioribus, cyaneo-nigris, opacis valde punctatis, ore antennisque pedibusque nigris. Long. .4.

Sacramento, Mr. Wittick, one specimen. This species belongs to the division named Pelonium, by Spinola, and although, by the colors of the upper surface, it immediately recalls *E. damicorne*, on comparison they are found to possess hardly a single character in common.

PTINUS Linn.

P. interruptus, niger vel fuscus, thorace postice valde constricto, antice obsoletius tuberculato, longe albo-setoso, elytris (maris) elongatis parallelis, striis punctatis, ad apicem laevigatis, seriatim cinereo-pilosis, antice, versum apicem et prope suturam albo-pubescentibus; subtus aequaliter cinereo-pubescentibus, pedibus saepe ferrugineis. Long. .10.

San Francisco, on flowers, May. Resembles very closely *P. quadrimaculatus* Mels., but the thorax is very slightly tuberculate, and hardly constricted at the apex.

SINOXYLON Duftschmidt.

S. declive, nigro-piceum, capite punctulato, thorace globoso antice tuberculato et exasperato, postice parce punctato, lateribus postice laevigatis saepe ferrugineis, elytris glabris confertim subrugose punctatis, ad apicem oblique declivibus vix tuberculatis, et versus suturam late sulcatis impunctatis, denticulo subsuturali parvo superne armato; pedibus antennisque rufis. Long. .22—.25.

Sacramento, Mr. Wittick. Differs from several species in my collection by the elytra having merely one very small acute tooth near the suture, at the upper part of the oblique posterior declivity.

EXOPS Curtis.

E. ovicollis, piceo-ater pubescens, capite thoraceque opacis, dense granulato-punctatis, pilis nigris erectis vestitis, hoc ovato, postice angustato, convexo, subcanaliculato, antice transversim vage impresso, elytris confertim punctulatis. Long. .73. Tab. I, fig. 19.

San Francisco; given me by Mr. J. P. Wild. This species differs from *E. Stoutii* Lec. by the thorax being more convex, opaque, and as strongly granulate in the middle as at the sides, while in *E. Stoutii* the middle of the disc is shining and not very densely punctured.

Upon *E. Stoutii* I formerly constructed a Genus *Alloeocnemis*, which I considered allied to *Nemosoma*, but, on finding it to be identical with *Exops*, made the necessary correction; but in doing this I was misled by Erichson's opinion, in *Agassiz Nomenclator Zoologicus*, that *Exops* is synonymous with the previously described *Polycaon* Laporte; the latter, as I am assured by Prof. Lacordaire, is an entirely different genus, which really belongs, as stated by Erichson, to the Melyridae.

NYCTOPORIS Esch.

N. galeata, atra, opaca, capite cristato, varioloso, thorace confluentur varioloso, quadrifoveato, foveis internis profundioribus, lateribus antice valde rotundatis, elytris cristis interruptis aequaliter elevatis. Long. .5—·6. Tab. II, fig. 1.

Very abundant at San Francisco, under bark of oak trees. Resembles *N. cristata* Esch., but, on comparison with a specimen of the latter, sent me by Col. Motschulsky, I find the following differences: The thorax is wider than long, and considerably rounded on the sides before the middle, while in *N. cristata* the length is equal to the breadth, and the sides are only moderately rounded. The tubercles, into which the crests of the elytra are broken, are much closer, and the crests are less elevated; the intervals are each marked with a row of elevated punctures.

NOSODERMA Sol.

N. diabolicum, nigrum opacum cataphractum, thorace latitudine longiore, latius canaliculato, disco utrinque impresso, partibus elevatis granulis nitidis parce notatis, margine crenulato, elytris, inaequalibus ante apicem subretusis, macula humerali alteraque apicali sordide cinereis. Long. .6—·8. Tab. II, fig. 2.

Lec. Ann. Lyc. Nat. Hist. of New York, 5, 130.

San José, Sacramento, and San Diego, under oak bark.

ELEODES Esch.

E. connexa, elongata, nigra, nitida, thorace latitudine brevior, postice angustato, modice convexo, parce punctulato, lateribus rotundatis, angulis anticis acutis prominulis, posticis obtusis, ad basin late rotundato, elytris thorace sesqui latioribus, elongatis ovalibus, postice declivibus subacutis, striis muricato punctatis, interstitiis subconvexis rugosis (præcipue versus latera) et parce muricato-punctatis; femoribus anticis dente acuto armatis. Long. .9; lat. elytr. .32; thor. .23.

Prairie Paso; Dr. Cooper. Forms one of a series of species connecting *E. sulcata* and *E. obscura*; distinguished from the former by the more convex, more rugose, and less deeply striate elytra, and from the latter by the smaller thorax, with prominent anterior angles.

E. sulcipennis. I formerly considered this as a geographical variety of *E. obscura*, but it differs in having a larger and less convex thorax. I am not yet sufficiently advanced in the study of this very difficult genus to determine whether it should be placed as a species or as a race.

E. granulata, elongato-ovata, nigra parum nitida, capite thoraceque subaequa liter punctatis, hoc subquadrato, minus convexo, latitudine paulo brevior, lateribus rotundatis, ad basin vix sinuatim rotundato, angulis posticis obtusis rotundatis, elytris thorace latioribus, ovalibus apice valde declivibus subacutis, dorso minus convexis seriatim granulatis et parce muricato-punctatis, versus suturam subseriatim punctatis; humeris subproductis; prosterno postice producto; femoribus muticis. Long. .58.

Oregon; Col. McCall. This and the next species are somewhat similar in form to *E. quadricollis*, but are less convex. The sculpture of the elytra is peculiar, being formed of small, somewhat shining, flat tubercles, arranged in series, with intervening scattered acute elevated punctures.

E. humeralis, longior ovata, atra opaca, capite thoraceque densius punctatis, hoc parum convexo, latitudine paulo brevior, subquadrato, postice angustiore, lateribus rotundatis, ad basin fere truncato, angulis posticis obtusis, elytris ovalibus, thorace latioribus, obsolete striatis dorso depressis ad apicem subacutis valde declivibus, granulis subacutis parvis minus confertim inordinatim positae, versus suturam punctatis; prosterno postice perpendiculari, femoribus muticis; tibiis anticis calcari interno duplo longiore. Long. .57—.65.

Wenass river to Fort Colville; Dr. Cooper. Readily distinguished by the foregoing characters. By the larger size of the spur of the anterior tibiae, it tends towards *E. tricolorata*, and several nondescript species.

E. cordata. Specimens of three forms, allied to this species, were obtained in Oregon, and, although evidently differing from those collected by me in California, I am not able to decide regarding the propriety of separating them. They may be known by the thorax being more broadly dilated, and more regularly rounded on the sides, although equally densely and coarsely punctured; the posterior sinuation is therefore much shorter, although the basal angles remain rectangular. The other distinctions are as follows:

1. *E. rotundipennis*. Thorax very much constricted behind, fully one-half wider than long; elytra as coarsely, but less densely punctured. Length, .45—.55.

2. *E. stricta*. Thorax less suddenly, but very much constricted at base, fully one-half wider than long; elytra more coarsely and less densely punctured. Long. .62.

3. *E. subligata*. Thorax only moderately constricted at base, scarcely wider than long; elytra punctured as in *E. cordata*. Length, .44.

HELOPS Fabr.

H. laetus, supra piceo-aeneus pernitidus, capite thoraceque confertim punctatis, hoc lateribus fortius marginatis, margine rufo-piceo, angulis anticis valde rotundatis, posticis subrectis subrotundatis; elytris striis profundis, interstitiis parce punctulatis, ante medium lateribus paulo concavis; subtus rufo-piceus. Long. .33.

One specimen, Steilacoom, Mr. Gibbs. Somewhat allied to *H. venustus* Say, but smaller and broader, with the sides of the thorax broadly margined, and the spaces between the striae of the elytra less convex.

CONONOTUS Lec.

C. sericans, testaceus, subtiliter confertissime punctulatus, griseo pubescens, thorace latitudine apicali sesqui longiore, postice regulariter valde angustato, utrinque truncato, elytris elongato ellipticis, parum convexis. Long. .13. Tab. II, Fig. 3.

Lec. Ann. Lyc. Nat. Hist. of New York, 5, 137.

San José, and San Diego, California, under stones. This genus is allied to Apocrypha, but the form is very different.

NYCTIBATES Esch.

N. serrata, atra opaca, capite thoraceque confluentur punctatis, hoc transverso, cordato, lateribus valde rotundatis pone medium subserratis, postice angustato, angulis posticis acutis prominulis; elytris thorace latioribus fortius punctato-striatis, dense punctatis; tibiis rectis, antennis breviusculis. Long. .9. Tab. II, Fig. 5.

Mann. Bull. Soc. Imp. Nat. Moscou, 1843.

Oregon. Nearly allied to a nondescript found in the northern Atlantic States, but differs by the less coarse punctures of the head and thorax, as well as by the latter being much narrowed towards the base. The punctures of the striae of the elytra are finer and more closely placed. This genus may be distinguished from its allies by the mentum being transverse, broader anteriorly, and obtusely rounded, flat or slightly concave.

PLATYDEMA Laporte.

P. oregonense, ovale convexum, nigrum nitidum, capite subtiliter punctato, ore clypeoque rufo-piceis, thorace brevi antrorsum angustato, lateribus marginatis vix rotundatis, basi bisinuato, angulis posticis rectis, subtiliter punctato; elytris striis punctulatis, interstitiis paulo convexis disperse subtiliter punctulatis, epipleuris piceis; pedibus antennisque ferrugineis, his articulo ultimo pallidiore. Long. .22.

Fort Vancouver, Colonel McCall. The elytra are slightly dilated from the base nearly to the middle, then gradually narrowed and rounded.

PHALERIA Latr.

P. globosa, rotundata convexa, testacea, capite thoraceque confertim punctatis, hoc antrorsum angustato, lateribus valde rotundatis, ad basin utrinque striola brevissima notato; elytris profunde striatis, interstitiis confertim rugosis et punctatis, guttis parvis ad basin versus scutellum, maculis duabus ante medium linea angulata connexis, alteraque ad dodrantem nigris; postpectore abdomineque obscuris; antennis ultra thoracis basin extensis. Long. .12. Tab. II, Fig. 4.

San Francisco, given me by Mr. J. P. Wild. Seems to resemble *P. picta*, but the thorax of that species is said to have two basal striae each side, and only one elytral black spot.

LYTTA Linn.

L. Cooperi, atra capite thoraceque laete fulvis nitidis laevigatis, illo basi subemarginato, ante oculos nigro, hoc pentagonali, latitudine brevior, angulis lateralibus acutis, dorso deplanato;

elytris lineis elevatis grosse reticulatis; antennis extrorsum incrassatis, articulis rotundatis, tibiis posticis calcari externo longiore dilatato. Long. .78. Tab. II, Fig. 6.

Lec. Proc. Acad. Nat. Sc. 7, 18.

Wenass River to Fort Colville. I have, with great satisfaction, dedicated this beautiful species to Dr. Cooper, by whom it was collected, and to whose industry we are indebted for many important collections in Oregon. It belongs to the group (A—b) of my synopsis of Meloidae (Proc. Acad. 6, 334) near *L. vulnerata*.

L. Childii, atra opaca, capite thoraceque parce punctatis, illo gutta verticali conspicus flavo, hoc latitudine longiore, lateribus antice rotundatis, elytris thorace sesqui latioribus scabris; antennis extrorsum crassioribus articulis rotundatis, ultimo plus duplo longiore acuminato; tibiis posticis calcari externo crasso cylindrico. Long. .6—·68.

San Francisco, collected by Mr. J. Child, to whom I dedicate it as a slight memorial of the many valuable species made known by his scientific zeal.

Nearly of the same form as *L. nitidicollis* Lec., but, from its uniform black color, resembling *L. moerens* Lec. From the latter it differs by the thick cylindrical outer spur of the posterior tibiae; the last joint of the antennae is longer than in either.

DITYLUS Fischer.

D. quadricollis, ater subtiliter nigro-pubescent, confertim subtiliter punctulatus, thorace latitudine fere brevior subquadrato, postice subangustato, ad basin marginato truncato, ad apicem late rotundato, lateribus antice rotundatis, postice subobliquis; elytris thorace fere duplo latioribus lineis quatuor obsoletis elevatis. Long. .65.

Lec. Ann. Lyc. Nat. Hist. of New York, 5, 157.

Steilacoom, Dr. Suckley and Mr. Gibbs. The description first published by me was taken from a specimen in which, by injury, the thorax had been flattened so as to become square with parallel sides; but in the others since obtained the sides converge slightly behind, but not nearly so much so as in *D. coeruleus*.

D. vestitus, ater subaenescens, pube fusca subsericea dense vestitus, capite thoraceque confertim subtiliter punctatis, illo linea verticali sublaevi, hoc latitudine longiore postice subangustato, ad basin marginato truncato, ad apicem late rotundato, lateribus ante medium rotundatis postice subsinuatis; elytris thorace sesqui latioribus dense scabro-punctatis, lineis elevatis quatuor obsoletis. Long. .59. Tab. II, fig. 7.

Shoalwater Bay, Dr. Cooper; one specimen. Remarkable by the dense brown pubescence with which it is covered; the body is slender, as in *D. gracilis*, but the thorax has no discoidal impressions.

BRUCHUS Linn.

B. pauperculus, oblongus, ater, undique cinereo-pubescent, thorace antrorsum angustato, confertim punctato, elytris profunde striatis interstitiis planis. Long. .045—.06.

San José and San Diego, California. By the small size, entirely black color, and uniform pubescence, this is easily distinguished from all others known to me.

RHYNCHITES Herbst.

R. glastinus, elongatus niger, supra nigro-cyaneus, griseo-pilosellus, capite parce punctato, inter oculos sulcato, sulco antice furcato et ad rostri apicem fere extenso, occipite transversim

rugoso, thorace latitudine vix longiore punctato; elytris fortiter seriatim cribratis, interstitiis uniseriatim punctatis; rostro valido brevi ad apicem latiore. Long. .15.

San Francisco, May. The rostrum is hardly longer than the head, and besides the two diverging grooves which unite between the eyes, there is a slight fovea between the antennae. Belong to Schönherr's Stirps 2, Manipulus 2.

APION Herbst.

A. crassinusum, nigrum minus subtiliter cinereo-pubescent, capite subtilius punctato, inter oculos profunde sulcato, rostro thorace vix longiore, crassiusculo ad basin paulo dilatato, punctulato ad apicem laevi, thorace confertim cribrato latitudine non longiore, lateribus paulo rotundatis, ad apicem subtubulato, ad basin medio profunde foveato; elytris subovatis longiusculis subaenescentibus, convexis, striis valde crenatis, interstitiis subrugosis, uniseriatim punctulatis, ad basin subtruncatis humeris rotundatis; antennis versus rostri basin insertis. Long. .08.

One specimen, San Francisco; another found by Dr. Cooper at Prairie Paso. Belongs to Schönherr's Stirps 1, near *A. Sayi*, but is much smaller and more elongate, being nearly the shape of *A. proclive*.

A. proclive, nigro-subaeneum fere opacum, parce cinereo-pubescent, capite punctato, inter oculos sulcato, rostro corporis dimidio haud brevior, tenui cylindrico paulo arcuato, utrinque ad latera postice unistriato; thorace latitudine haud longiore antrorsum angustato, lateribus parum rotundatis, ad apicem transversim paulo constricto, grosse punctato, basi medio foveato; elytris convexis ovatis, humeris obtuse rotundatis, thorace duplo latioribus, striis crenatis, interstitiis subplanis subtilissime rugosis; antennis versus rostri basin insertis. Long. .08.

San Francisco, June, not rare. The foregoing characters will enable it very readily to be recognized. It may be, perhaps, *A. cuprescens* Mann., but the description of the latter is not very definite, and its locality is Sitkha.

A. cribricolle, nigrum (capite fracto,) rostro crassiusculo subarcuato, thorace paulo longiore, subtiliter rugose punctulato; thorace latitudine haud brevior confertim cribrato-punctato, ad apicem angustato et subconstricto, lateribus subparallelis, pone medium canaliculato; elytris virescentibus fere nitidis, striis crenatis, interstitiis planis subrugosis, subtilissime uniseriatim pubescentibus, convexis longius ovatis, ad basin subtruncatis, humeris obtuse rotundatis; antennis ad rostri medium insertis. Long. .07.

San Francisco, one specimen.

A. cavifrons, nigrum parce subtiliter cinereo-pubescent, capite punctato, inter oculos tenuiter carinato utrinque longe excavato, rostro thorace paulo longiore, crassiusculo cylindrico, versus basin opaco; thorace latitudine haud brevior, antrorsum angustato, lateribus paulo rotundatis, confertim cribrato-punctato linea dorsali profunde antice paulo abbreviata; elytris ovatis longiusculis convexis fere nitidis subvirescentibus, striis fortiter crenatis, interstitiis vix rugulosis, uniseriatim punctulatis, ad basin subtruncatis humeris obtuse rotundatis; antennis versus rostri medium insertis, articulis baseos duabus rufis. Long. .08.

Prairie Paso, Dr. Cooper. Only one specimen was obtained of this very interesting species; the thorax is not at all constricted at the apex.

A. protensum, valde elongatum, nigrum, capite punctato inter oculos subfoveato, ante oculos

transversim impresso, rostro thorace longiore, tenui punctulato ad apicem lævi, pone medium paulo dilatato; thorace latitudine sesqui longiore, ad medium paulo rotundato, ad apicem subtubulato, grosse punctato, postice canaliculato, elytris elongatis subovalibus, convexis, striis crenatis interstitiis rugosis biserialim subtilissime punctulatis; antennis pone rostri medium insertis. Long. .08.

San Francisco. The elytra are twice as wide as the thorax, and are almost regularly oval; more than twice as long as their greatest width.

SITONES Germ.

S. vittatus, elongatus niger, dense cinereo squamosus, fronte sulcato, rostro extrorsum late concavo, thorace latitudine longiore, fusco bivittato, subcanaliculato punctato, elytris striatis interstitiis 2; 4, 6 et 8vo fuscis, reliquis cinereis uniserialim setulosis; oculis parum prominulis. Long. .17.

San Francisco and San Diego. Of the size, shape, and sculpture of *S. seniculus*, but differs by the regular vittæ of the elytra, and by the entirely black antennæ; the rostrum is concave only beyond the extremity of the frontal groove.

S. sordidus, longiusculus niger, dense sordide squamosus, fronte sulcato, rostro ad apicem concavo, thorace latitudine haud longiore, punctato vix vittato; elytris striatis interstitiis alternis uniserialim setulosis; antennis ad basin ferrugineis; oculis parum prominulis. Long. .2.

With the preceding. Larger and less slender than *S. seniculus*, and distinguished by the rostrum being slightly narrowed at base, and flat above as far as the end of the frontal groove, and then concave to the apex. In *S. seniculus* the rostrum is concave for nearly its entire length, and is not at all narrowed at the base. The color of the scales is cinereous in *S. seniculus*, and dirty yellowish brown in the present species.

ALOPHUS Schönh.

A. didymus, niger, ochreo fusco subtiliter dense pubescens, rostro canaliculato, thorace dense punctato, latitudine vix brevior, antice profunde constricto, lateribus antice paulo rotundatis tenuiter canaliculato, vitta utrinque sublaterali pallidior; elytris thorace sesqui latoribus, dense subtiliter rugose punctulatis, ochreo nigroque subtesselatis, gutta utrinque ante medium alteraque ad dodrantem densius pallide pubescentibus. Long. .48.

Lec. Proc. Acad. Nat. Sciences 7, 20.

Oregon, Dr. Townsend. Smaller and narrower than *A. alternatus* Say, and readily distinguished by the different form of the thorax, and by the absence of elytral striæ.

A. constrictus. On comparing a specimen from Sitkha, sent me by Baron Chaudoir, and one collected by Dr. Cooper on the journey from Vancouver to Yokolt, with *A. alternatus* Say, found at Lake Superior, I find them entirely different. The species from Oregon and Russian America has the sides of the thorax subserrate and the apex strongly constricted; the body is, also, more elongate, and the thorax is much smaller. *A. didymus* approaches it more nearly; the thorax of that species is not at all narrowed towards the base, and the sides are not serrate.

LISTRODERES Schönh.

L. terebrostris, niger oblongus, cinereo-sordide squamosus, capite rostroque confertim punctatis, illo thorace paulo brevior paulo arcuato, cylindrico, dense argenteo squamoso haud carinato, fronte sufoveato, thorace latitudine longiore, lateribus rotundatis, confertissime punctato, parce nigro-punctato et pilosello; elytris thorace latioribus, latitudine fere duplo longioribus ad basin late emarginatis, humeris rotundatis, nigro-variegatis striis punctatis interstitiis parce uniseriatim nigro-punctatis et setulosis; antennis piceis, articulo 3io secundo plus sesqui longiore. Long. .24.

One specimen, San Francisco. Two other specimens were found, of a much smaller size, (.15—.18,) but I can find no character upon which to separate them, except that the scales upon the thorax appear more flat, so that no scabrous appearance results.

L. oregonensis, niger oblongus, sordide squamosus, rostro thorace vix brevior, confertim punctato et rugoso, subtiliter carinato, capite confertim punctato, thorace grosse confertissime punctato, latitudine vix brevior, lateribus rotundatis, antrorsum angustato ad apicem transversim paulo impresso, elytris thorace latioribus ad basin truncatis, latitudine sesqui longioribus, humeris paulo rotundatis, striis punctatis, interstitiis confertim punctulatis; antennis nigris, articulo 3io secundo fere duplo longiore. Long. .27; lat. elytrorum .11.

One specimen, Shoalwater Bay, Dr. Cooper. The scales are nearly all removed by the spirits in which it was preserved.

HYLOBIUS Germ.

H. taeniatus, elongatus, ater opacus, tenuiter flavo-pubescent, rostro 5-sulcato, ad apicem latiore, thorace inaequali grosse valde punctato, latitudine vix longiore, lateribus late rotundatis, irregulariter late canaliculato, et antrorsum vage impresso; elytris thorace sesqui latioribus, ad basin subtruncatis, punctis magnis quadratis striatim positis, interstitiis granulato-punctatis, quinto macula ad quadrantem, alteraque ad dodrantem flavo-pilosis, macula subhumerali scutelloque flavo-pilosis; antennis elongatis, femoribus, muticis. Long. .53.

One specimen, Vancouver, Colonel McCall. The middle groove of the rostrum commences in a fovea between the eyes, and extends to the apex; the lateral grooves are in front of the eyes, they are broad behind, and gradually narrowed anteriorly, vanishing a little beyond the middle; the intermediate grooves are vague and anterior. The antennal grooves extend to the inferior part of the eyes, and are deep; the two basal joints of the funiculus are elongate, the second is one-half longer than the first, and twice as long as the third. This species cannot be a Hylobius, but I do not know where to place it; and while the family of Curculionidae is in such inextricable confusion as has been produced by the generic descriptions of Schönherr, it is absurd to establish any other genera, except upon the most remarkable characters. The characters, however, seem to be nearly those of Geonemus.

H. torpidus, ater, capite cum rostro confertim punctato, hoc subtiliter carinato, ad apicem incrassato, thorace profunde canaliculato, latitudine haud longiore subrotundato, rude rugose punctato, interstitiis punctatis, elytris connatis ovalibus, postice perpendiculariter declivibus, thorace haud sesqui latioribus, dense nigro-squamosis, breviter setulosis, punctis magnis operculatis striatis, postice versus latera squamulis luteis variegatis; femoribus muticis, tibiis anticis curvatis intus serratis. Long. .3—.32.

Oregon, Dr. Townsend and Mr. Gibbs. The specimen collected by Dr. Townsend was given to me by Mr. Willcox, as *Barynotus torpidus* of the Berlin Museum; but the species belongs as little to *Barynotus* as to *Hylobius*. The prothorax is lobed behind the eyes; the rostrum is longer than the head, with the antennal groove very short and slightly flexed. The antennae are slender, with the first and second joints of the funiculus elongate, the others rounded, short and equal.

PTOCHUS Schönherr.

P. saccatus, ater cinereo-pubescent, capite cum rostro confertissime punctato, canaliculato, hoc ad basin impresso, ultra medium concavo, thorace latitudine plus duplo brevior, lateribus parum rotundatis, confertim sat grosse punctato; elytris globosis, punctis quadratis striatis, interstitiis punctulatis. Long. .2.

Oregon, Dr. Cooper. The scales and most of the pubescence have been removed.

P. globiventris, ater, supra parce viridi-argenteo squamosus, capite thoraceque cinereo-pubescentibus, illo cum rostro profunde punctato, fronte fovea oblonga impresso, rostro plano; thorace latitudine brevior, lateribus rotundatis, grosse sat dense punctato, elytris globosis punctato-striatis, interstitiis obsolete punctulatis. Long. .2.

San Francisco, one specimen. The antennal grooves are very short, and on the upper surface of the rostrum, which at tip is hardly emarginate. The body beneath is thinly clothed with cinereous hair, and greenish white scales. The antennal club is longer than in the preceding species.

OTIORHYNCHUS Germ.

O. segnis, elongatus niger, squamulis cinereis fuscisque vestitus, capite rostroque confertim punctatis, hoc capite paulo longiore, vage longitudinaliter impresso, ad basin transversim impresso, thorace latitudine vix longiore, ovali lateribus rotundato, densissime punctato, vix obsolete canaliculato, elytris elongato-ovalibus, postice valde declivibus, thorace parum latioribus, punctis rotundatis operculatis striatis; tibiis anticis valde curvatis, intus parce serratis. Long. .4.

Sacramento, Mr. Wittick; Prairie Paso, Dr. Cooper.

O. ? naso, alatus niger (cinereo? squamosus), capite rostroque confertim punctatis, hoc carinato, capite duplo longiore ad apicem valde dilatato; thorace latitudine haud brevior, antrorsum angustato, lateribus paulo rotundatis, confertissime punctato, elytris ad basin thorace sesquelatioribus, humeris obtusis distinctis, punctato-striatis, interstitiis punctulatis; tibiis anticis curvatis, intus subserratis. Long. .36.

Oregon, Col. McCall. Certainly not *Otiorhynchus*. The thorax is not lobed behind the eyes; the ungues are distant and free, and the antennae are as in *Otiorhynchus*. The form of body is somewhat as in *Phyllobius* or *Brachystylus*, and still more as in *Platyomus*; the antennal grooves are slightly deflexed, but become obsolete posteriorly; the divergence of the apical lobes of the rostrum is as great as in *Otiorhynchus*.

TYLODERES Schönherr.

T. gemmatus, ater, breviter parce setulosus, dense sordide cinereo-squamosus, rostro carinato, capite plus duplo longiore, ad apicem latiore; thorace latitudine sublongiore, lateribus rotundatis, antrorsum paulo angustiore, tuberculis nitidis obsito, profunde canaliculato, canali lateri-

busque pallidioribus; elytris connatis ovalibus, postice perpendiculariter declivibus, sutura costisque tribus densius, interstitiis parce tuberculatis. Long. .37—.45.

Shoalwater Bay, Dr. Cooper. Seems to agree more nearly with *Tyloderes* than with any other genus, but the thorax is very slightly lobed behind the eyes.

EMPHYASTES Mann.

E. fucicola, nigro-piceus, testaceo limbatus, vel totus testaceus, glaber, oblongus; rostro sulcis utrinque duabus postice convergentibus, sulcoque antico notato, thorace rotundato subtransverso parce punctato; elytris ovalibus convexis postice subacutis striatis interstitiis convexis, rugose punctulatis punctisque magnis sparsis impressis, pedibus testaceis genubus tibiaram apice tarsique infuscatis. Long. .3. Tab. II, fig. 8.

Mann. Bull. Mosc. 1852.

Sitkha and San Francisco, near the sea shore under sea weed. This genus is very remarkable by the tibiae being thick, and much dilated at the apex. A smaller species was found by me at San Diego.

LIXUS Fabr.

L. auctus, elongatus ater, dense cinereo-pubescens, flavo-pollinosus, fronte puncto impresso; thorace punctis nigris nitidis paucis notato, latitudine baseos haud brevior, antrorsum angustato, lateribus fere rectis, dorso late minus profunde sulcato; elytris punctis grossis striatis, ad apicem singulatim longe acuminatis; femoribus muticis. Long. .5.

Oregon, Dr. J. K. Townsend. One specimen given to me by Mr. Willcox under the above name.

MAGDALINUS Germ.

M. imbellis, piceo-ferrugineus, rostro sat dense, capite confertim punctato, inter oculos breviter canaliculato, thorace latitudine haud longiore, antrorsum angustato, lateribus rotundatis, angulis posticis acutis prominulis, confertissime punctato, subcarinato; elytris parallelis apice rotundatis, dense rugosis parce squamulosis, fortiter punctato striatis; postpectore abdomineque nigris; femoribus subtus unidentatis. Long. .24.

One specimen found by Dr. Cooper on the journey from Vancouver to Yokolt.

M. gracilis, magis elongatus niger opacus, capite rostroque confertim punctatis, thorace quadrato, lateribus parallelis antice subserratis, ad apicem subito angustato, et subtubulato, confluentem punctato, linea antica vix laevi notato; elytris thorace parum latioribus, elytris striis crenatis, interstitiis connexis rugosis uniseriatim albo-setulosis; femoribus unidentatis. Long. .16.

San Francisco, not rare. Sufficiently distinct by the above characters from any found in the Atlantic States.

BALANINUS Germ.

B. uniformis, piceus, undique densissime fulvo-pubescens, concolor, rostro ferrugineo, corpore paulo brevior, arcuato laevigato, thorace latitudine brevior, antrorsum valde angustato, lateribus paulo rotundato ad apicem subtubulato, elytris latitudine haud sesqui longioribus, a humeris postice sensim angustatis, striato punctatis; femoribus subtus acute dentatis. Long. .28.

Sacramento, Mr. Wittick; Steilacoom, Dr. Suckley. Resembles much a species which I con-

sider as *B. nasicus* Schönh., but the rostrum has only a very few punctures near the base, the thorax is more generally rounded in front, and the elytra are more regularly narrowed from the base and less rounded on the sides; the color of the pubescence is almost entirely uniform.

BARIDIUS Schönherr.

B. macer, niger nitidus, elongatus, capite rostroque confertim punctatis hoc ad basin transversim impresso arcuato, thorace paulo brevior; thorace latitudine haud longior, a basi sensim, ad apicem subito rotundatim angustato, sat dense grossius punctato, linea dorsali vix conspicuo; elytris vix impressis, striis profundis leviter punctatis, interstitiis uniseriatim punctulatis, pygidio grosse confluentem punctato. Long. .13—.15.

San Francisco; belongs to Schönherr's Stirps 1.

B. seriatus, elongatus, niger subnitidus, capite parce punctulato, opaco, rostro rugose punctato, arcuato, thorace vix brevior, ad basin transversim impresso; thorace grosse punctato; latitudine vix longior, lateribus subparallelis ante medium valde rotundatis; elytris striis impunctatis profundis, interstitiis uniseriatim fortius punctulatis. Long. .09.

One specimen found at San Francisco; belongs to the same division as the preceding.

ANALCIS Schönherr.

A. morbillosus, elongatus ovalis, niger, thorace latitudine paulo longior, lateribus pone medium, subparallelis ante medium rotundatis, disperse at profunde foveatim punctato, spatio dorsali sublaevi haud elevato, guttis utrinque ad medium albo-pilosis, elytris maculis albopubescentibus variegatis, seriatim foveatim punctatis, interstitiis subrugosis. Long. .2.

One specimen found at San Francisco. Nearly allied to *A. foveolatus*, (*Tyloderma foveolatum* Say,) but distinguished by the thorax being not carinate, much less densely foveolate and not narrowed or rounded on the sides behind the middle; also by the spots being formed of white instead of yellow pubescence.

RHYNOPHORUS Schönherr.

R. asperulus, elongato-ovalis, niger nitidus, fronte foveato, rostro ad latera punctato, thorace latitudine longior, minus subtiliter punctato, punctis ad latera asperatis, linea dorsali vix distincta; elytris striis fortiter punctatis, interstitiis uniseriatim subtiliter punctatis, seriebus saepe paulo confusis. Long. .5.

One specimen, Sacramento; Mr. Wittick. The punctures of the thorax become gradually muricated towards the sides, where they are acute and terminated by a very short bristle.

SPHENOPHORUS Schönherr.

S. gentilis, piceo et rufo-piceo variegatus, nitidus, elongatus, rostro cylindrico, punctato, ad basin canaliculato, canali in fovea frontali desinente; thorace latitudine longior, lateribus parallelis antice rotundatis, ad apicem breviter tubulato, dense grosse punctato, linea latiuscula dorsali laevi; elytris striis valde profundis, modice punctatis, interstitiis uniseriatim subtiliter punctatis. Long. .28—.36.

San José, California; belongs with most of our native species to the division of the genus with narrow tarsi and cylindrical rostrum, but differs from all others in my collection by the thorax being without impressions, and having only a single elongated dorsal smooth space.

DENDROCTONUS Er.

D. valens, rufo-piceus, flavo-hirtus, capite rugose punctato, thorace latitudine brevior, lateribus postice fere parallelis antice convergentibus, ad apicem sinuato, ad basin late bisinuato, confertissime punctato, linea tenui dorsali pone medium sublaevi, antice vage transversim impresso, subtubulato; elytris cylindricis confertim granulato-punctatis, striis vagis, foveatim punctatis. Long. .34.

One specimen, San Francisco; Mr. Child. Much larger and broader than the next species, and differs from the large species of the Atlantic States by the finer and denser punctuation of the thorax.

D. similis, rufo-piceus, flavo-hirtus, capite rugose punctato canaliculato, canali interrupto, thorace latitudine brevior, a basi antrorsum sensim angustato, lateribus rotundatis, ad apicem profundius sinuato, ad basin late bisinuato, confertissime punctato, antice vage transversim impresso subtubulato; elytris cylindricis confertim granulato-punctatis, striis vagis foveatim punctatis. Long. .25.

Oregon, abundant; collected by Col. McCall and Dr. Cooper.

BOSTRICHUS Fabr.

B. pubipennis, cylindricus longiusculus, nigro-piceus, thorace latitudine sesqui longior, ante medium tuberculato et exasperato parce puberulo, pone medium parce punctulato, elytris subtilissime punctulatis dense flavo-puberulis et parce setulosis, postice oblique declivibus haud armatis; capite plano marginibus longe flavo-pilosis. Long. .1.

San José, California.

CORTHYLUS Er.

C. scutellaris, cylindricus, piceo-niger, nitidus, capite convexo scabro, thorace latitudine haud sesqui longior, ante medium sensim asperato; elytris versus basin indeterminate rufo-piceis, subtiliter subseriatim parce punctatis, postice declivibus, granulis tribus vel quatuor parvis armatis; pedibus antennisque rufis, his clava obscuriore. Long. .13.

One specimen, San José, California. Less elongate than *C. fasciatus*.

ERGATES Serv.

E. spiculatus, elongatus piceus, capite profundissime canaliculato, tuberculo suboculari valde acuto, elytris rugose punctatis. Long. 2.15—2.55. Tab. II, fig. 9.

Mas antennis longioribus, extrorsum attenuatis, articulis 3—4 punctis elevatis exasperatis, thorace latitudine duplo brevior subtiliter dense scabro, vage inaequali antice biimpresso, lateribus serratis, femoribus anticis subtus transversim rugosis. Fig. 9a.

Femina, antennis corpore duplo brevioribus, articulis punctatis, thorace antrorsum angustato, lateribus inaequaliter longe spinosis, dense fortius scabro inaequali, antice utrinque subcalloso.

Lec. Proc. Acad. Nat. Sc. 7, 218.

Trichocnemis spiculatus Lec. Journ. Acad. Nat. Sc. 2nd ser. 2, 110.

Oregon and California. The genus *Trichocnemis* was established by me upon the female of this species, under the belief that the pubescence of the anterior feet differed from that of *Ergates*. But on comparing with the European species, I find no sufficient reason why they should not be placed together, and it therefore gives me pleasure to make the necessary correction.

ASEMUM Serv.

A. asperum, nigro-piceum, tenuiter pubescens, capite scabro-punctato, oculis magnis valde emarginatis, thorace latitudine brevior rotundato punctato, medio late excavato, versus latera punctis elevatis exasperato, elytris subtiliter scabris, lineis duabus obsoletis vix distinctis. Long. .7—.9.

Lec. Proc. Acad. Nat. Sciences, 7, 18.

Prairie Paso, Dr. Cooper, found in July and August. This fine species seems intermediate between *Criocephalus* and *Asemum*; the eyes though as large as in the former genus are deeply emarginate; the antennae are hardly half as long as the body, and pubescent. The discoidal excavation of the thorax does not extend much in front of the middle.

OPSIMUS† Esch.

O. quadrilineatus, piceus pubescens, capite punctato, canaliculato, thorace confertissime punctulato, canaliculato, lateribus medio spina acuta retro tendente armatis, pone spinam concavis, ante spinam rotundatis; elytris elongatis, saepe fusco-testaceis, densissime punctulatis, lineis utrinque duabus tenuibus elevatis, tertiaque externa obsoleta; femoribus crassis, oculis divisis. Long. .37. Tab. II, fig. 10.

Mann. Bull. Mosc.

Sitkha, Baron Chaudoir and Col. Motschulsky; Oregon, Dr. Cooper. The genus *Opsimus* was founded upon this species, but I have not found any description of it in print. It is closely allied to *Tetropium* (*Criomorphus Muls.*) in the form of the head and eyes, but the maxillary palpi are much longer than the labial, and the anterior coxae are not transverse, and but slightly angulated externally; the antennae taper gradually outwards, and are quite hairy, much longer in the male than in the female.

CALLIDIUM Fabr.

C. aeneum, aeneo-piceum, parcius pubescens, thorace latitudine brevior, rotundato punctulato, antice posticeque marginato, elytris thorace paulo latioribus, nitidissimis, parce punctatis, femoribus valde clavatis, antennis ad basin rufescentibus. Long. .3.

Phymatodes aeneus Lec. Proc. Acad. Nat. Sc. 7, 18.

One specimen found by Dr. Cooper on the journey from Vancouver to Yokolt Plain. This species somewhat resembles in appearance *C. aereum* Newm.

C. Mannerheimii, piceum subtiliter dense pubescens, thorace latitudine brevior, lateribus rotundatis, utrinque angustato, dense punctulato, linea dorsali sublaevi, elytris a basi ad dimidium obscure ferrugineis, femoribus ad basin rufo-piceis. Long. .44.

Callidium dimidiatum|| Mann. Bull. Mosc. 1846.

One specimen, Steilacoom, Dr. Suckley. Resembles *C. dimidiatum* Kirby, (*palliatum* Hald.,) but differs in the thorax, being narrowed before as well as towards the base.

C. vulneratum, nigro-piceum nitidum, capite thoraceque fortius punctatis, hoc latitudine vix brevior, lateribus late rotundatis, ad basin angustato, parce pilosello; elytris a basi ad medium fortiter minus dense punctatis, obscure ferruginis, dein subtiliter punctulatis nigro-piceis, fascia transversa albicante subelevata ad medium notatis. Long. .35.

One specimen, found at San Francisco by Mr. Child. The whitish fascia is slightly elevated, and is directed slightly forwards from the margin to the suture.

C. decussatum, piceum nitidum parce pubescens, capite dense, thorace fortius punctato, latitudine vix brevior, lateribus rotundatis, antice posticeque angustato, antice transversim impresso, linea dorsali sublaevi, elytris parce fortiter punctatis, versus apicem sensim laevibus, ad basin pallidioribus, fascia postice obliqua ante medium, alteraque antice tendente pone medium albicantibus subelevatis ornatis. Long. .25.

One specimen, Sacramento, California, Mr. Wittick. The two fasciae, with those of the opposite side, produce a figure nearly like the diagonals of a square; the anterior one is suddenly angulated near the margin.

CROSSIDIUS Lec.

C.? *hirtipes*, ater, thorace confertim punctato latitudine brevior, lateribus obtuse armatis, ad basin marginato, disco utrinque pone medium subfoveato; elytris confertim subtilius punctatis, fulvis sutura basique nigromarginatis, abdomine sanguineo ad basin obscuro; subtus parcius longe pilosus, tibiis intus dense pilosis. Long. .5.

Lec. Proc. Acad. Nat. Sc. 7, 18.

One specimen, found by Dr. Cooper on the journey from Wenass river to Fort Colville. The palpi and antennae are destroyed; it should possibly form a separate genus, as the mandibles are emarginate at tip, as in *Crossidius*, while the thorax, as in *Purpuricenus*, is obtusely armed at the sides. The upper surface may have been hairy, but the hair has been entirely removed; the elevated lines are hardly visible.

The genus *Crossidius* was constructed by me upon a pale yellow hairy insect from San Diego, having the antennae 12-jointed, the mandibles emarginate, the thorax rounded, the elytra not truncate, and the body very hairy.

ROSALIA Serv.

R. funebris, supra holosericea, capite atro, thorace cinereo, macula magna ovali dorsali alteraque utrinque minore nigris, 4-tuberculato; scutello cinereo, elytris atris, fascia ante medium, altera pone dodrantem, margineque apicali cinereis, punctoque sublaterali pone medium saepe ornatis; subtus cinereus holosericeus, antennis cinereo-annulatis. Long. 1.08—1.32. Tab. II, fig. 11.

Motschulsky, Bull. Mosc. 1845, 1, 87, tab. 2, fig. 8; Mann. *ibid.* 1852.

Rosalia alpina (err. typog.) Lec. Journ. Acad. Nat. Sc. 2d ser. 2.

Oregon, at the Dalles, Dr. Suckley, and at Steilacoom, Mr. Gibbs. Found at Sitkha, according to Motschulsky. Varies with the lateral whitish dot of the elytra wanting; also, with the posterior fascia interrupted at the suture, and not extending to the margin; the fasciae vary much in breadth, and are sometimes dilated at the suture.

CLYTUS Fabr.

C. conjunctus, niger, thorace latitudine paulo brevior, margine antico flavo, dorso longitudinaliter elevato, et carinulis quatuor vel quinque transversis notato; elytris annulo basali interrupto ad suturam extendente, fasciisque duabus posticis linea suturali connexis pallide

flavis; abdomine flavo, nigro annulato; femorum basi tibiis tarsis antennisque ferrugineis, femoribus posticis modice elongatis. Long. .65.

One specimen, San Francisco, Mr. Child. Similar to *C. capraea*, but, besides slight differences in the form of the basal yellow ring-like mark, the two posterior fasciae are connected by a yellow sutural line.

ULOCHAETES Lec.

Caput deflexum, fronte quadrato perpendiculari, pone oculos subito at parum constrictum; oculi emarginati; antennae inter oculos pone medium insertae; palpi breves articulis turbinatis subaequalibus; antennae corporis dimidio aequales, articulis 3io et 4to conjunctis 5to aequalibus. Thorax transversus lateribus et dorso acute tuberculatus, densissime pilosus. Elytra abbreviata, scabra ad apicem subacute rotundata, humeris valde elevatis. Tarsi posteriores articulo 1mo sequentibus conjunctis aequali. Alae abdomine longiores rectae.

This genus contains but one very remarkable species allied to *Necydalis*. It differs, however, by its much less elongate form, by its less constricted neck, and also by the different proportions of the joints of the antennae; the elytra diverge posteriorly, showing a tendency to a subulate form.

U. leoninus, niger, capite griseo-pubescente, thorace antrorsum angustato densissime longe griseo-piloso, antice valde transversim impresso, postice paulo constricto, elytris opacis ad apicem late testaceis; tibiis testaceis apice nigris; antennis basi obscure testaceis, alis fuliginosis. Long. .96. Tab. II, fig. 12.

Lec. Proc. Acad. Nat. Sc. 7, 82.

One specimen, found at Prairie Paso by Dr. Cooper. The scutellum is smooth and shining, with the sides hairy; the pectus is thinly clothed with grayish hairs.

ACMAEOPS Lec.

A. coriacea, nigro-picea, crassa, parum nitida, thorace lateribus acute tuberculatis, elytris postice obtusis, rugosis. Long. .75. Tab. II, fig. 13.

Lec. Proc. Acad. Nat. Sc. 7, 219.

Piodes coriacea Lec. Journ. Acad. Nat. Sc. 2d ser. 1, 318.

Oregon. From its large size and stout form this insect resembles in appearance a small *Prionus*, and was, therefore, placed by me as a separate genus; on a careful reconsideration, I could find no characters of importance by which to retain it as distinct from *Acmaeops*.

A. fusca, pubescens, fusca, capite confertim punctato, canaliculato, thorace confertim punctato, latitudine vix brevior, antrorsum angustato et ibi lateribus rotundato, ad apicem vix constricto fortius marginato, linea dorsali postica laevi; elytris sat dense versus basin paulo fortius ad apicem subtilius punctatis, parallelis postice obtusis. Long. .5.

Sacramento, Mr. Wittick. Allied to *A. californicus* Lec., but is larger and stouter, with the thorax less rounded on the sides, which are parallel behind the middle; the thorax is also more strongly margined and less constricted at the apex; the punctures of the elytra towards the base are smaller and more dense than in that species, and the humeri are less prominent.

A. lugens, atra pubescens, capite confertim punctato canaliculato, thorace confertim punctato, linea dorsali postica laevi, latitudine brevior, lateribus antice valde rotundatis, ad apicem

fortius marginato, subito constricto et breviter tubulato; elytris sat dense postice subtilius punctatis, parallelis postice obtusis. Long. .5.

One specimen, found at Sacramento by Mr. Wittick. Resembles the preceding, but the form of the thorax is very different.

A. subcyanea, nigra parce pubescens, capite thoraceque minus dense punctatis, hoc linea dorsali sublaevi, latitudine haud brevior, antrorsum subangustato, lateribus antice paulo rotundatis, ad apicem constricto breviter tubulato; elytris antice fortiter minus dense, postice subtilius punctatis, obscure cyaneis, parallelis postice obtusis. Long. .41.

San Francisco, Mr. Child. Also related to the preceding and to the next species, but differs by the thorax being less densely punctured. The elytra are more coarsely and less densely punctured towards the base than in *A. lugens* and *fusca*, resembling in this character *A. subaenea* Lec., from which it differs by the thorax being broadly rounded, and not angulated at the sides.

A. tumida, cyaneo-atra pubescens, capite thoraceque confertim punctatis, hoc linea dorsali laevi, latitudine brevior, convexo, lateribus postice parallelis, antice valde rotundatis, ad apicem valde constricto et tubulato; elytris antice fortiter minus dense, postice subtilius punctatis, a basi paulo angustatis postice obtusis. Long. .42.

One specimen, San Francisco, Mr. Child. The thorax is formed as in *A. lugens*, but the elytra are punctured as in *A. subcyanea*.

TOXOTUS Serv.

T. flavo-lineatus, niger flavo-pubescens, thorace antice posticeque valde constricto, nitido parcius punctulato, canaliculato, lateribus tuberculo magno acuto armatis; elytris a basi angustatis, thorace duplo latioribus dense punctulatis et rugosis, margine a basi fere ad apicem vittaque utrinque dorsali postice evanescente antice abbreviata ornatis ad apicem oblique subtruncatis. Long. 1.0.

Lec. Proc. Acad. Nat. Sc. 7, 18.

One specimen, found by Dr. Cooper on the journey from Vancouver to Yokolt Plain. The elytra on each side of the yellow discoidal vittae are marked with a distinct elevated line.

T. spurcus, testaceus, supra parce subtiliter pubescens, capite canaliculato, subtiliter thorace evidentius rugose punctato, hoc canaliculato latitudine paulo longiore antrorsum angustato, utrinque transversim valde impresso, lateribus spina valida acuta armatis; elytris thorace duplo latioribus parallelis postice obtusis spina brevi suturali armatis, antice fortius postice subtilius punctatis, gutta submarginali ad medium strigisque duabus posticis nigricantibus. Long. .96.

Steilacoom, one specimen, Mr. Gibbs. Of the same form as *T. Schaumii* Lec., but the elytra are not obliquely truncate at tip. The elytra of the male are therefore probably slightly narrowed from the shoulders. The fourth joint of the antennae is a little shorter than the third, and one-half as long as the fifth.

LEPTURA Linn.

L. vitiosa, nigra, flavo-pubescens, capite rufo-variegato, thorace confertim punctato, latitudine brevior antrorsum angustato, lateribus subangulatis basique subito depressa testaceis, angulis posticis productis, disco nigro subcanaliculato, postice utrinque oblique impresso; elytris punctatis, flavis macula laterali ad medium apiceque late nigris, a basi angustatis ad apicem

oblique emarginatis; pedibus testaceis, femoribus, tibiis que posticis ad apicem, genibus tarsisque nigris, antennis pallido annulatis. Long. .7.

Strangalia vitiosa Lec. Proc. Acad. Nat. Sc. 7, 18.

Fort Vancouver and Prairie Paso, Dr. Cooper. In one specimen the third joint of the antennae is entirely black; in the other it is pale at the base, like the following ones. This species closely resembles *L. obliterated*, but the thorax is shorter and more broad behind. The impressions are much stronger, and the disc is separated from the base by a sudden declivity. The basal margin is yellow; and on the elytra there is no trace of the two spots before the middle, seen in *S. obliterated*, and the apex is not at all rufous.

The testaceous sides of the thorax and annulated antennae were not mentioned in the description given by me of *Strangalia obliterated*, (Journ. Ac. Nat. Sc. 2d ser. 1, 328,) as, on account of the very dark color of the only specimen then known to me, they were not observed.

L. impura, longiuscula, sordide testacea, flavo-pubescent, capite thoraceque obscuris dense punctatis, illo linea frontali subtili, thorace latitudine paulo longiore, convexo, lateribus postice parallelis ad medium subangulatis, ad apicem breviter constricto; elytris confertim punctatis, macula rotundata submarginali ad medium nigricante notatis, a humeris postice subangustatis ad apicem oblique truncatis. Long. .4.

One specimen, without antennae, sent by Mr. Wittick from Sacramento. Quite distinct from every other species known to me, and, although of a slender form, seems to belong to the (A—7) division of *Strangalia*.—(Vide Journ. Acad. Nat. Sc. 2d ser. 1, 332.)

L. laeta, crassiuscula nigra dense sericeo aureo-pubescent, thorace convexo, utrinque constricto, lateribus valde rotundatis, medio tuberculatis; elytris nigris, fasciis quatuor latis flavis aureo-pubescentibus, fasciis secunda et tertia ad suturam connexis; pedibus ferrugineis, antennis corporis dimidio haud longioribus crassis, oreque obscure ferrugineis. Long. .6.

California, at Sacramento, Mr. Wittick; Steilacoom, Mr. Gibbs. A very beautiful species, allied to *L. nitens*, but very distinct. The anterior yellow fascia is curved, and sometimes connects with the second at the suture.

L. amabilis, elongata nigra, supra parce subtiliter pubescens, capite thoraceque confertissime punctatis, hoc latitudine haud longiore, antrosum angustato, lateribus rotundatis, ad apicem constricto, ante basin transversim impresso, angulis posticis acutis; elytris intra humeros longius impressis, confertim punctatis, macula rotundata prope scutellum, fascia postice obliqua ante medium, altera latiore ad trientem ab apice, et macula rotundata ante apicem pallide flavis, postice subangustatis, ad apicem oblique emarginatis; antennis pedibusque obscure ferrugineis, femoribus infuscatis. Long. .3.

A very beautiful little species, of which a single specimen was collected by Mr. Gibbs at Steilacoom. It belongs, with the preceding, to division (A—7) of *Strangalia*.

L. valida, elongata, testacea, subtilius pubescens, thorace parvo latitudine longiore, ante medium angustato, utrinque constricto, canaliculato, dense subtilius punctato, parceque grosse punctato; elytris thorace duplo latioribus, nebulis duabus ante medium, duabus ad medium alteraque maiore ante apicem fuscis, parallelis postice obtusis, spina suturali prominula. Long. 1.05. Tab. II, fig. 14.

One specimen, from Shoalwater Bay, Dr. Cooper. Of the anterior spots, the inner is larger;

but of the pair at the middle, the outer one is larger, near the margin, and placed in advance of the inner one.

L. crassipes, elongata, nigra, capite thoraceque longius flavo-pilosis, hoc latitudine longiore, convexo, antrorsum, parum angustato, utrinque constricto, lateribus medio valde rotundatis; elytris fortius punctatis, breviter pubescentibus, intra humeros longius impressis, luteis margine tenui, macula subhumerali altera ad medium trienteque postica nigris, macula flava rotundata ante apicem signatis, postice subangustatis ad apicem oblique truncatis; pedibus crassiusculis testaceis, antennis validis nigris. Long. .44.

Steilacoom, Mr. Gibbs. The black spots of the elytra are all connected by a narrow black margin. The elytra are shaped as in *L. octonotata* Say, but the thorax is deeply constricted at each end; this species, with the next, and *Frankenhaeuseri* and *macilenta*, form a group not represented in the Atlantic States, somewhat approaching *Centrodera* Lec. in form.

L. fuscicollis, elongata testacea, capite thoraceque nigro-fuscis, breviter pubescentibus, densissime punctatis, hoc latitudine longiore, antrorsum angustato, utrinque profunde constricto, lateribus medio obtuse tuberculatis, subtiliter canaliculato, elytris fortius punctatis, glabris, testaceis a humeros subangustatis, intra humeros impressis, ad apicem vix truncatis; antennis elongatis fuscis. Long. .48.

One specimen, San Francisco; Mr. Child.

PLECTRURA Mann.

P. producta, nigro-picea, parce griseo-bupescens, guttulis flavo-pubescentibus parce adspersa, confertim rugose punctata, thorace callo dorsali parvo, elytris callis nitidis seriebus quinque digestis, ad apicem non crenulatis, singulatim longe acuminatis. Long. .5. Tab. II, fig. 15.

Lec. Proc. Acad. Nat. Sc. 7, 19.

One specimen, collected by Dr. Cooper at Fort Vancouver. Differs from the description of *P. spinicauda* by the tips of the elytra being not crenulated, as well as by the different arrangement of the tubercles of the elytra. They form five series, of which only the outer one is entire; the others contain only three or four tubercles; the sutural one is indistinct, the second ends just behind the middle, the third and fourth commence about one-third from the base, and end at one-fifth from the apex; the scutellum and a little thoracic line anterior to it are densely clothed with yellow hair.

TETRAOPES Dalman.

T. oregonensis, niger, capite thorace elytrisque coccineis (pallide pubescens?) thorace punctis 4 nigris, disco subito elevato, antice posticeque valde constricto, lateribus subito valde dilatatis, parcius punctato, elytris parce punctatis, puncto humerali duobus ante medium, altero utrinque pone medium, scutelloque nigris; pedibus antennarumque articulo primo coccineis, tarsis, genibus, tibiisque posticis nigris. Long. .55.

Lec. Proc. Acad. Nat. Sc. 7, 19.

Wenass river to Fort Colville; Dr. Cooper. This species has the form of *T. femoratus* Lec., but the thorax is still more dilated on the sides. From *T. basalis*, in which the basal joint of the antennae is also red, it is easily distinguished by the sudden elevation of the middle of the thorax. The pubescence has been removed by the alcohol in which the specimens were pre-

served, and I cannot, therefore, know whether the antennæ are black or annulated. The black spots are very small, those of the elytra are in the usual position, and, with the exception of the humeral one, disappear in many specimens.

MESOSA Serv.

M. Guexi, atra dense breviter cinereo-pubescent, thorace parce punctato antice modice constricto, lateribus breviter tuberculato, elytris thorace plus sesqui latioribus, parce punctatis versus basin scabris, maculis duabus transversis undulatis nigris utrinque ornatis, antennis annulatis. Long. .8. Tab. II, Fig. 16.

Lec. Journ. Acad. Nat. Sc. 2d ser. 2, 166.

A female found by me, at Benicia, and two males collected by Dr. Heermann, in California. The male has longer and more hairy antennae, and the elytra slightly narrowed behind the humeri.

DONACIA Fabr.

D. pyritosa, elongata, cupreo-ænea, capite non toroso, thorace confertissime rugoso, postice haud angustato, angulis omnibus subprominulis, canaliculato ante basin transversim impresso, tuberculo laterali, parvo, distincto, parum prominulo; elytris convexis parallelis, dense rugosis, punctato-striatis, vage biimpressis postice rotundatis; antennis fusco-nigris, crassiusculis, articulis 2—4 sensim longioribus, femoribus posticis dente acuto armatis; pedibus ferrugineis, femoribus ad apicem infuscatis. Long. .32.

One specimen, Shoalwater Bay; Dr. Cooper. Closely resembles *D. pusilla*, but the thorax is not narrowed behind; the anterior lateral tubercles are smaller and less prominent; the elytra are broader and more finely rugous.

SYNETA Esch.

S. albida, pallida elongata, capite thoraceque grosse punctatis, hoc lateribus medio acute tuberculatis, utrinque constricto, antrorsum subangustato; elytris confertim seriatim punctatis, costa dorsali obsoleta alteraque a humero ad apicem extensa. Long. .28.

Oregon; Mr. Townsend and Dr. Suckley.

S. simplex, testacea, capite thoraceque paulo obscurioribus confertim punctatis, hoc latitudine vix brevior lateribus medio obtuse tuberculatis, utrinque modice constricto, elytris fortius vix ordinatim punctatis, costa parum elevata a humero extensa postice obsoleta; antennis obscuris ad basin pallidis. Long. .27.

Steilacoom, Dr. Suckley; one specimen.

SAXINIS Lac.

S. saucia, ovata convexa, chalybea nitida, thorace antrorsum valde angustato, lateribus rotundatis depressis, medio valde convexo, subtilissime, lateribus fortius punctulatis, ad basin marginato bisinuato, medio late subtruncato, elytris subconfuse punctato-striatis, macula magna humerali rufa ornatis; subtus pygidioque cinereo-pruinosis. Long. .3.

A fine and large species found in Oregon and California.

EUMOLPUS Kugellan.

E. smaragdulus, supra viridi aeneus nitidus, confertim punctatus, pube brevi rigida alba parce vestitus, capite aequali, thorace convexo lateribus rotundato, elytris fortius inordinatim punctatis. Long. .15.

One specimen, Sacramento, Mr. Wittick. Resembles in generic characters several other species, which, in form, appear like *Pachnephorus*, but they are distinguished by the posterior tibiae being not toothed, while the claws are strongly toothed. I have not found any description or name for this genus, which is readily known by these two characters, and by the thorax not being lobed behind the eyes.

CHRYSOCHUS Redt.

C. cobaltinus, splendide cyaneus vel viridi-cyaneus, nitidus, thorace parce punctulato et disperse grosse punctato, lateribus postice parallelis, antice subito rotundatis, angulis anticis prominulis, elytris modice punctatis. Long. .45.

Oregon and California. Larger than *C. auratus*, and distinguished by the sides of the thorax being more suddenly rounded near the apex, and by the elytra being less sparsely and more distinctly punctured.

HALTICA Fabr.

H. puncticollis, flavo-testacea, ovalis modice convexa, thorace latitudine brevior, antrorsum angustiore, fortius punctato, guttis quatuor nigris ornato, scutello, elytrorum vitta suturali, altera sub marginali ad apicem connexis, dorsalique postice paulo abbreviata nigris; labro, palpis, antennis tibiis tarsisque nigris; metasterno testaceo, postice nigro. Long. .3—.35.

Oregon and California. Resembles closely *H. alternata*, but differs by the thorax being much more distinctly punctured, and by only the posterior part of the metasternum near the middle is black. I have adopted the name under which it was sent me by Col. Motschulsky.

H. limbicollis, elongato-ovalis, nigra, capite parce punctulato, lateribus et basi marginatc, limbo toto flavo, elytris subtilius sat dense punctatis, vittis duabus margineque tenui flavis ad apicem connexis. Long. .3.

Sacramento, Mr. Wittick. Similar to *H. pennsylvanica*, but narrower, with the thorax sparsely punctured. The elytra are not sulcate, and the yellow vittae are broader.

H. prasina, olivaceo-aenea, thorace latitudine brevior, antrorsum haud angustato, lateribus subrectis marginatis, punctato, postice transversim sulcato; elytris subsulcatis punctulatis, costa submarginali postice ad suturam flexa. Long. .23.

San Francisco. Narrower than *H. plicipennis*, and distinguished by the more strongly punctured thorax not being narrowed anteriorly, and by the elytra being feebly sulcate.

H. obolina, oblonga, cupreo-aenea, thorace nitido convexo, latitudine brevior, antrorsum paulo angustato, lateribus vix rotundatis, parce punctulato, postice transversim sulcato, elytris sat dense punctatis haud costatis. Long. .17.

San Francisco, not common. The more convex thorax distinguishes this from some allied species in my collection.

H. lazulina, oblonga, viridi-cyanea, nitida, thorace latitudine brevior, antrorsum subangustato, lateribus paulo rotundatis, subtiliter punctulato, postice transversim subtilius impresso; elytris subtiliter fere obsolete punctulatis. Long. .15.

Steilacoom, one specimen, Mr. Gibbs. Resembles in size and form *H. punctipennis*, Lec., (Report of Capt. Pope's Expedition,) but is distinguished by the blue color and the obsoletely punctured elytra.

H. cerina, flavo-testacea, nitida, ovalis convexa, thorace parce subtiliter punctulato, convexo, lateribus rotundatis; elytris subtiliter punctato-striatis, ad latera et apicem laevibus; ore postpectoreque paulo infuscatis. Long. .06.

One specimen, San José, California. This species seems to belong to the division named *Crepidodera*, by Chevrolat, but the thorax has no posterior impression.

H. aereola, oblonga, cupreo-aenea, nitida, capite angulatim impresso, occipite laevi, thorace subrugoso, grosse confertim punctato, postice transversim sulcato, et striola brevissima utrinque insculpto; elytris fortiter striato-punctatis, interstitiis subtilissime punctulatis, antennis pedibusque ferrugineis. Long. .1—·13.

San Francisco; allied closely to *H. helxines*, but the thorax is more punctured and less convex, and the posterior transverse impression is less deep, and does not extend beyond the short basal striae.

H. subcrinita, oblonga, obscure aenea, capite angulatim impresso, occipite laevi, thorace confertim punctato, postice transversim sulcato et fovea parva basali utrinque notato; elytris cinereo-pubescentibus, fortiter striato-punctatis, interstitiis parce rugosis et punctulatis; antennis pedibusque testaceo-piceis, femoribus posticis obscuris. Long. .05—·07.

San Francisco. Allied to *H. pubescens*, but narrower and less pubescent; the thorax is less coarsely and less densely punctured.

H. ligata, elongata, nigra glabra, thorace latitudine brevior, sat punctato, piceo-nebuloso, lateribus late rotundatis, versus latera postice obsolete impresso, elytris sat dense punctatis, stria suturali obsolete impressa, vitta dorsali lata testacea utrinque ornatis, antennis pedibusque piceo-testaceis, femoribus posticis nigris. Long. .15.

One specimen, San José, California. Belongs to the division *Systema*, of Chevrolat, and is allied to *H. elongata* Fabr., (*teniata* Say,) but the thorax is shorter and more gradually rounded on the sides.

H. subcenea, elongata, aeneo-nigra glabra, capite parcius, thorace sat dense minus subtiliter punctato, latitudine fere sesqui brevior; elytris sat dense minus subtiliter punctatis; antennis pedibusque fusco-testaceis, illis articulo primo, his femoribus obscuris, posticis autem nigris. Long. .15.

One specimen, San José, California. Belongs also to the division *Systema*, and is similar in appearance to *H. frontalis*, but the thorax is broader and strongly punctured.

H. albionica, oblongo-elongata, aeneo-nigra, nitida, capite parcius, thorace elytris minus subtiliter punctatis; thorace latitudine brevior antrosum angustato, antennis pedibusque nigris. Long. .08.

San José and San Diego, California. Of the size of *H. striolata*, but narrower and less convex.

H. lepidula, oblonga, aeneo-nigra, nitida, capite parcius, thorace elytris minus subtiliter punctatis, thorace latitudine brevior antrosum angustato; elytris utrinque vitta dorsali postice paulo flexa, et fere ad apicem extensa pallida ornatis; antennis pedibusque nigris. Long. .11.

San José and San Diego. Similar in form and sculpture to *H. albionica*; the fifth joint of the antennæ of the male is conical and dilated.

PSYLLIODES Latr.

P. parvicollis, elongato-ovalis, antice angustior, aeneo-nigra, capite parce punctulato thorace confertim punctato, antrorsum angustato, angulis anticis oblique truncatis; elytris striato-punctatis, interstitiis paulo convexis punctulatis; antennis fuscis ad basin testaceis, tibiis tarsisque piceo-testaceis. Long. .09.

San José, California. Of the same form as *P. punctulata* Mels., but with the striæ of the elytra deeper, more finely and closely punctured.

P. convexior, ovalis antice angustior, aeneo-nigra, capite parce, thorace confertim punctato antrorsum subangustato, angulis anticis oblique truncatis; elytris pernitidis convexis punctato-striatis, interstitiis planis parce subtilissime punctulatis; antennis fuscis ad basin testaceis, tibiis tarsisque fusco-testaceis. Long. .10.

San José, one specimen. Larger and more convex than the preceding, but agreeing in form with a nondescript found at Lake Superior; it differs, however, in having the thorax more convex and less narrowed in front, and the elytra more rounded on the sides.

CHAETOCNEMA Stephens.

C. irregularis, oblonga, griseo-aenea, capite thoraceque fortius punctatis, hoc latitudine brevior, antrorsum haud angustato, spatio parvo dorsali postico laevi; elytris subparallelis convexis fortius confuse punctato-striatis. Long. .08.

San José. Very distinct from the other species known to me, not only by the form, but by the irregular confused rows of punctures of the elytra.

LUPERUS Geoffr.

L. varipes, elongatus, supra cyaneo-viridis, haud politus, thorace quadrato, latitudine haud brevior, angulis rectis, lateribus antice paulo rotundatis sat dense punctato; elytris punctatis; subtus niger, pedibus anticis testaceis, tarsis et femorum dimidio basali nigro-fuscis, antennis fuscis ad basin fusco-testaceis. Long. .19.

San Francisco. Very different from the other species known to me, by the square punctured thorax.

L. longulus, elongatus niger, thorace capiteque cyanescentibus, illo polito quadrato, latitudine fere longior, subtiliter praecipue versus latera punctato, angulis rectis, lateribus subsinuatis; elytris virescentibus, subtiliter scabro-rugosis, versus latera obsolete striatis; pedibus antennisque nigris, his articulo secundo subpicescente. Long. .2.

One specimen, Oregon. Also very distinct from any other North American species known to me.

GALLERUCA Geoffroy.

G. rudis, picea, ovata, convexa supra glabra, capite thoraceque rude punctatis, hoc late canaliculato, bifoveato, inaequali, antrorsum angustato, lateribus subangulatis; elytris sutura elevata costisque quatuor sublaevibus, interstitiis sulcoque marginali profunde rude punctatis. Long. .4.

A very fine species found by Mr. Gibbs at Steilacoom. Belongs to the group named Adimonia; I am not prepared to adopt it as a genus, as I have failed to discover sufficient reason for its separation.

G. consputa, elongata, luteo-testacea, pubescens, confertim minus subtiliter punctata, capite linea media nigra, thorace canaliculato et untrunque ad latera vage impresso, vitta dorsali nebulaque laterali nigris; elytris intra humeros oblique, et versus latera a humeros postice late impressis, sutura elevata guttisque plurimis parvis nigris; subtus fusca, pedibus testaceis nigropunctatis. Long. .15.

San José, California. The lateral impression of the elytra extends from the humerus for two-thirds their length, running a little inwards from the margin, and becoming obsolete; the black spots along its inner margin are frequently confluent into a vitta.

G. guttulata, elongata, fusco-testacea, valde cinereo-pubescens, dense fortius punctata, thorace brevi late canaliculato, ad latera inaequali; elytris intra humeros oblique impressis, ad marginem late sulcatis, guttis rotundatis nigris parce subseriatim notatis. Long. .19.

One specimen, San Francisco. Larger than the preceding, with the suture not elevated, and not black.

G. morosa, elongata, piceo-nigra, tenuiter cinereo-pubescens, capite subtiliter dense punctato, callis duobus supra antennis laevibus, thorace valde punctato, inaequali, medio profunde, versus latera vagius foveato; elytris thorace parum latioribus convexis, confertim minus subtiliter punctatis, sutura elevata, versus scutellum plana. Long. .25.

One specimen, San Francisco.

PSYLOBORA Muls.

P. taedata, rotundata, supra pallida, thorace maculis quatuor obscuris, elytris subtiliter parcius punctulatis, maculis magnis testaceis nigro-variegatis confluentibus; subtus testacea, parapleuris pedibusque pallidis. Long. .10.

San Francisco, abundant. Smaller than *P. 20-maculata* Muls.; the elytra are less strongly and less densely punctured; the spots are larger and confluent, of a paler color, with only some portions black; the parapleurae are also entirely white.

CHILOCORUS Leach.

C. fraternus, niger, nitidus, thorace lateribus rotundatis, elytris macula rotundata rubra untrunque ornatis, disco vix conspicue, versus marginem distinctius punctatis abdomine rufo, segmento primo medio nigro; epipleuris oblique declivibus parum concavis. Long. .2.

One specimen, Sacramento, Mr. Wittick. Resembles in every respect *C. bivulnerus* Muls., except that the punctures of the elytra are less distinct and almost obsolete, and by the epipleurae being less concave anteriorly.

HIPPODAMIA Muls.

H. moesta, rufescente-nigra nitida, dense subtiliter punctulata, macula rhomboidea frontali, thoracis margine laterali antice posticeque latiore, linea dorsali antica, guttis dorsales duabus albis; elytris thorace latioribus, macula laterali alba triangulari ad dodrantem ornatis Long. .3.

Lec. Proc. Acad. Nat. Sc. 7, 19.

Prairie Paso, Dr. Cooper. The unguis are acutely toothed, as in most species of the genus; the white lateral spot of the elytra is between one-fourth and one-fifth from the apex, and in one specimen is slightly dilated along the margin.

COCCINELLA Linn.

C. subversa, hemispherica, nigra, capite ante oculos albo (ore clypeoque feminae nigris,) thorace subtiliter punctulato, lateribus rotundatis, macula quadrata utrinque ad angulos anticos apiceque albis; elytris distincte et subtiliter punctulatis, praecipue macula nigra obliqua utrinque ad medium notatis, scutello nigro. Long. .2.

Lec. Proc. Acad. Nat. Sc. 7, 19.

Fort Vancouver. This species closely resembles *C. californica*, but is smaller, and much more distinctly punctulate on the elytra.

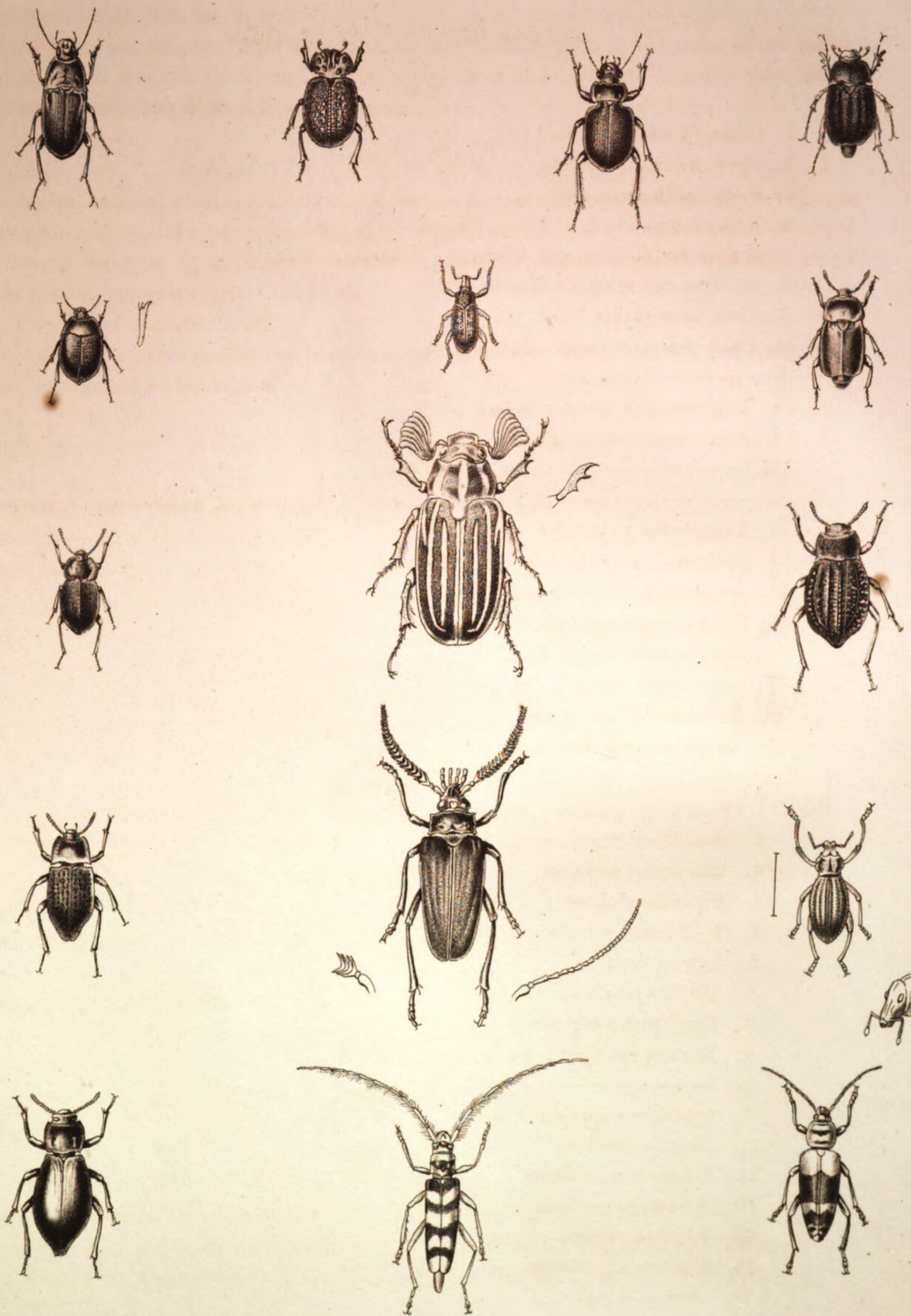
REFERENCES TO THE PLATES.

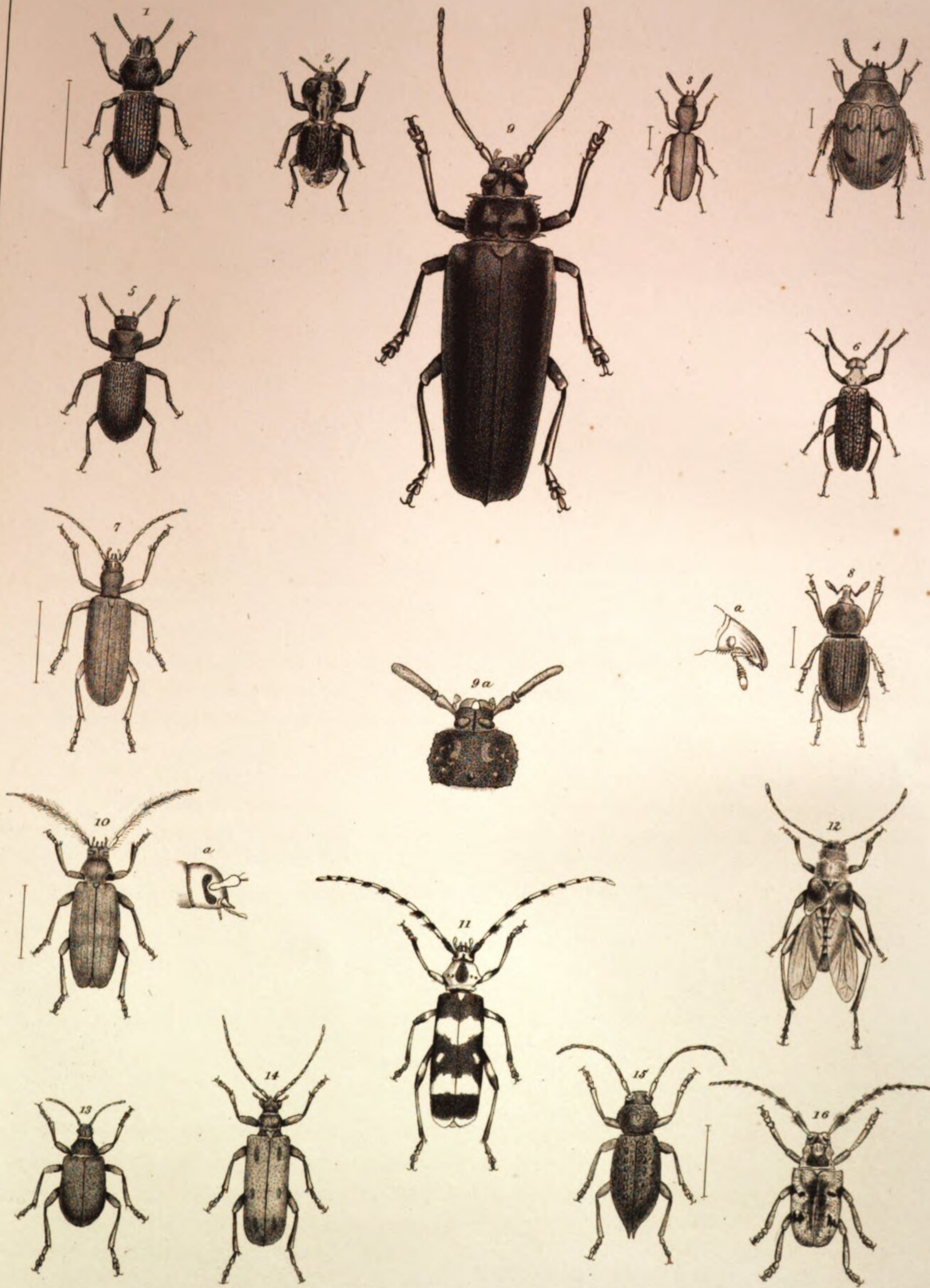
PLATE I.

- Fig. 1. *Omus Dejeanii Reiche*.
 2. ——— *Audouinii Reiche*.
 3. ——— *californicus Esch*.
 4. *Promecognathus laevisissimus Chaud*.
 5. *Agaosoma californicum Ménétriés*. *a.* anterior tibia.
 6. *Cychrus tuberculatus Harris*.
 7. *Carabus taedatus Fabr*.
 8. *Calosoma cancellatum Esch*.
 9. ——— *discors Lec*.
 10. *Trachypachys inermis Motsch*.
 11. *Amphizoa Insolens Lec*.
 11*a.* ——— ——— under view of head.
 11*b.* ——— ——— under view of trunk; *c.* Antenna; *d.* anterior leg; *e.* posterior leg.
 12. *Thinopinus pictus Lec*.
 13. *Pleocoma fimbriata Lec*. *a.* antenna.
 14. *Amphicyrta chrysomelina Er*.
 15. *Sinodendron rugosum Mann*.
 16. *Ancylochira Langii Lec*.
 17. ——— *Gibbsii Lec*.
 18. *Perothops Witticki Lec*.
 19. *Exops ovicollis Lec*.

PLATE II.

- Fig. 1. *Nyctoporis galeata*.
 2. *Nosoderma diabolicum*.
 3. *Cononotus sericans*.
 4. *Phaleria globosa*.
 5. *Nyctobates serrata*.
 6. *Lytta Cooperi*.
 7. *Ditylus vestitus*.
 8. *Emphyastes fucicola*.
 9. *Ergates spiculatus ♀*.
 9*a.* ——— ——— ♂.
 10. *Opsimus quadrilineatus*.
 11. *Rosalia funebris*.
 12. *Ulochaetes leoninus*.
 13. *Acmaeops coriacea*.
 14. *Leptura valida*.
 15. *Plectrura producta*.
 16. *Mesosa Guexi*.





No. 2.

REPORT UPON THE MAMMALS COLLECTED ON THE SURVEY.

CHAPTER I.

REPORT BY J. G. COOPER, M. D.

NEOSOREX NAVIGATOR, Cooper.

BAIRD, Gen. Rep. Mammals, 1857, 11.

SP. CH.—Fur much longer than the ears. Palms and soles margined by a fringe of bristles. Hind feet nearly as long as the skull. Tail one-half longer than head and body. Color above, dark sooty brown, mixed with hoary; beneath, greyish white; tail silvery white beneath. Head and body 2.10; tail 3.

But one specimen of this species was obtained during the expedition; this, according to the label now attached, was found at Fort Vancouver, but I am inclined to consider this a mistake, and that it was really taken while swimming under water in a lake near the summit of the Cascade mountains, August 31, 1853.

SOREX VAGRANS, Cooper.

BAIRD, Gen. Rep. Mammals, 1857, 15.

SP. CH.—Third upper lateral tooth smaller than the fourth. Above, olive brown, washed with hoary; beneath, dusky yellowish white; sides a little paler than the back. Head and body 2 inches; tail 1.75. Hind foot about .47 of an inch.

Specimens were obtained at Shoalwater Bay, W. T.

SCALOPS TOWNSENDII, Bach.

Oregon Mole.

Scalops townsendii, BACH. J. A. N. S. Ph. VIII, 1839, 58.

AUD. & BACH. N. A. Quad. III, 1853, 217; pl. cxlv.

BAIRD, Gen. Rep. Mammals, 1857, 65.

SP. CH.—Teeth 44. Eye small, but not covered by the integument. Tail rather scantily haired. Nostrils opening on the upper surface of the tip of the snout. Palm large and broad. Color nearly black, with faint purplish or sooty brown reflection. (Sometimes, perhaps, glossed with silvery?)

Moles are not common in any part of the Territory I have visited. Two specimens were obtained at Shoalwater Bay, where they burrow more like the gophers than the *S. aquaticus*, throwing up little mounds at a yard or two apart, though they sometimes in soft ground formed continuous galleries just beneath the surface.

FELIS CONCOLOR, L.

American Panther.

BAIRD, Gen. Rep. Mammals, 1857, 83.

The *cougar*, incorrectly called panther, and American or California lion. This ferocious and blood-thirsty animal is very common in the Territory, where numbers are killed every year. It is more dreaded for its depredations on stock, however, than for a disposition to attack man, of which I never heard of an instance unless when it was wounded or in defence of its young. The Indians have a great fear of it, partly, no doubt, mixed with the superstitions which influence them so much. But in California, where it is abundant and grows to a great size, the hunters agree that it will always "vamosé" when met with, while, if a hunter suddenly meets a "grizzly," he considers it the "better part of valor" to "vamosé" himself. I prepared a skin and skull of a young male cougar that was killed in February, 1854, at the "Cascades" of the Columbia. It had stolen a large hog, and when pursued and shot at several times, finally leaped on to a high stump, whence a rifle ball through the forehead soon brought it down. It being the rainy season, and no means at hand of drying the skin artificially, it was unfortunately spoiled. This one measured 7 feet 4 inches from nose to tip of tail, the tail itself being 2 feet 7 inches long. Height at fore shoulder 3 feet. Many have been reported in the papers as measuring from 9 to 11 feet in total length. The old idea that no feline animal will voluntarily take to the water, though now contradicted by many proofs, is still prevalent. In this animal we have an instance to the contrary. A steamboat descending the Columbia river met with one swimming across where the river was at least a mile and a half wide, and without difficulty the men succeeded in capturing it by means of noose thrown over it. It was sent to California, where I saw it exhibited in December, 1855. It was then full grown, very fat, and with beautiful glassy fur of a rich brown color. A few of the black stripes, more marked in southern specimens, could be seen along the sides and legs where the white of the under parts joined the brown. It was restless and playful, but with that treachery characteristic of the race in every movement. Its keeper ruled it with a rod of iron, to which it always showed strong objections by growling, spitting, and obstinately refusing to obey his commands as long as it dared to resist.

Though thought to be common in many places where I have hunted, I never had the satisfaction of meeting with one in its native wilderness or even of hearing its terrible scream.

LYNX FASCIATUS, Raf.

Red Cat.

Lynx fasciatus, Raf. Am. Month. Mag. II, Nov. 1817, 46.

BAIRD, Gen. Rep. Mammals, 1857, 96.

Tiger cat, LEWIS & CLARK, Travels, II, 1814, 167.

SP. CH.—Fur very soft and full. Ears pencilled. Color, rich chestnut brown on the back, a little paler on the sides and on the throat. A dorsal darker collar on throat, as dark as the sides. Region along central line of belly (rather narrow one) dull whitish, with dusky spots extending to lower part of sides. No spots or bands discernible on the upper part of sides. Ears black inside, with a very inconspicuous patch of grayish. Terminal third of tail above, black.

The tiger cat of Lewis and Clark is very abundant in the forests of Washington Territory. The numbers that will resort to a farm yard, in a retired situation, for prey, is wonderful. One man told me that he had killed at his place, during one season, no less than fifteen, a large herd of young pigs being the attraction. His dog, but little larger than the wild cats, would boldly attack them, and though sometimes severely scratched, always came off victor. All that I have seen were very thin, so that they probably do not find much food in their forest

haunts, where the blue grouse must be the largest game they can capture. In the fall they, no doubt, feast, like many other animals, on the multitudes of dead salmon washed up on river banks.

I only once saw one alive, which was walking along a fallen trunk of a tree, whose top lay in the water, trying to get at a flock of half-fledged sheldrakes. It was so intent on the game that it did not notice our canoe silently and rapidly approaching it. The Indian in the bow startled it from its pursuit by lodging a charge of buck-shot in its side. It fell into the water, but soon recovered and attempted to climb out again. A stroke of a paddle stunned it, but it was sometime before it died, showing great tenacity of life.

While travelling on the Columbia, I have heard in the densely forest clad mountains near its mouth, a loud screaming, answered from the hills around, which I was told was caused by the wild cat. This was always before sunrise, and the number was too great to have been caused by panthers.

LYNX RUFUS.

American Wild Cat.

Felis ruffa, GULDENSTAEDT, Nov. Comm. Petrop. XX, 1776, 499.

BAIRD, Gen. Rep. Mammals, 1857, 90.

Lynx rufus, RAF. Am. Month. Mag. II, 1817, 46.

AUD. & BACH. N. A. Quad. I, 1849, 2; pl. i.

SP. CH.—Fur moderately full and soft. Above and on sides pale rufous, overlaid with grayish; the latter color most prevalent in winter. A few obsolete dark spots on the sides, and indistinct longitudinal lines along the middle of the back. Collar on the throat like sides, but much paler. Beneath, white spotted. Inside of fore and hind legs banded. Tail with a small black patch above at the end, with indistinct subterminal half rings. Inner surface of the ear black, with a white patch.

In California the wild cat is no less numerous than in Washington Territory. During a stay of six weeks in that country, in the fall of 1855, I saw two, and heard of many others being killed. The country being more open, they are much more easily hunted than in the north, and often appear in the open prairie in the day time. One I met while hunting hares, about noon, and where I had been shooting several times the same morning. Two of us tried to steal upon it from opposite sides, but, as there was no shelter, it saw us and galloped off rapidly to a dense thicket near by. The same day, having obtained dogs, it was "treed" and shot. Many had been already killed near by as they came down from the wild mountains to the farm. They often sat in some thicket convenient to the house, and during the day succeeded in catching many fowls that unwarily approached their lair, as the occasional screaming and confusion among the poultry testified. When the owner had dogs, there was generally no difficulty in driving the cat up a tree, and there shooting it.

CANIS OCCIDENTALIS.

Large Wolf.

BAIRD, Gen. Rep. Mammals, 1857, 104.

One or more species of wolf is found west of the Cascade mountains, but I could never obtain a specimen. They are of very large size, and howl in a loud dismal tone, very different from the yelping bark of the "coyote," which I never heard in the forest covered regions. They are said to be of a light gray color, and instances are related of their pursuing and devouring men, especially in cold winters. It seems strange that while two or three species of wolves, besides foxes, are very abundant in the prairies and deserts east of the Dalles, where there is no game larger than hares and sage fowl, they seem to shun the regions inhabited by elk and deer west of the mountains. They have, however, become more common since the introduction of sheep in some districts.

? *VULPES MACROURUS*, Baird.

Red Fox.

BAIRD, Gen. Rep. Mammals, 1857, 130.

The same remarks apply to foxes as to wolves, respecting their range. I never saw even the skin of one killed west of the Cascade Range, though they are undoubtedly found in small numbers. The great difficulty of hunting such animals in the dense forests is one reason, and the general substitution of strychnine for traps another why their skins are less often seen, many being needlessly afraid to skin an animal killed by strychnine.

MUSTELA PENNANTII, Erx1.

Fisher.

BAIRD, G n. Rep. Mammals, 1857, 149.

"Fisher" skins are brought by the Indians from the mountains. They do not, however, seem to be common, and of their habits or distribution I have obtained no information.

?? *MUSTELA AMERICANA*, Turton.

Sable.

While on the Cascade mountains I saw among the Indians a few skins of the size of that of the ermine, but without the black tip to their tail and of a cream yellow color. They were used as ornaments, and in trade, and valued very highly. They were said to be obtained only on the mountains.

LUTRA CALIFORNIA, Gray.

California Otter.

BAIRD, Gen. Rep. Mammals, 1857, 187.

The otter is abundant in every stream in the Territory, numbers living even at Cape Disappointment at the junction of the salt with the fresh water, where they have formed paths leading up the almost perpendicular rock to the dense thickets above, and quite inaccessible to the hunter. Though I have often watched for them, I never saw one, so nocturnal and cautious are they in their habits.

ENHYDRA MARINA, Fleming.

Sea Otter.

BAIRD, Gen. Rep. Mammals, 1857, 189.

The sea otter is not found near the mouth of the Columbia river, as it prefers rocky coasts and islands. From the "Quinailt," a small river emptying about 50 miles north, to Cape Flattery, numbers of skins are brought, for which the Indians, obtain an extravagant price—in goods, often as much as \$30 to \$40.

MEPHITIS OCCIDENTALIS, Baird.

California Skunk.

? *Mephitis mesomelas*, St. HILAIRE, Voy. de la Venus, Zoologie, I, 1855, 133; plate.*Mephitis occidentalis*, BAIRD, Gen. Rep. Mammals, 1857, 194.

SP. CH.—Size of a cat. Tail vertebrae two-thirds the length of head and body. Bony palate with small narrow emargination in the middle of its posterior edge. Color black, with a white nuchal patch, bifurcating behind and reaching to the tail, which is entirely black.

Skunks are very common in the country west of the Cascade mountains, frequenting the borders of woods and settlements. I have often seen them both alive and dead, and all appeared to be of the common eastern species. The commonest markings were black, with a narrow white stripe running back from each shoulder. To show the persistence of the smell, I will mention that wishing to obtain a skull, I took a stick and tried to separate it from what was then only a mass of fur and bones, the animal having been dead about a year, but such an overpowering odor arose that I was glad to retreat without the specimen. I afterwards got one in California, where, being exposed to the sun, the scent had almost entirely left the dried carcass.

MEPHITIS BICOLOR.

Little Striped Skunk.

Mephitis bicolor, J. E. GRAY, Charlesworth's Mag. N. H. I, 1837, 581.

BAIRD, Gen. Rep. Mammals, 1857, 197.

Mephitis zorilla, LICHTENSTEIN, Ueber Mephitis, Abh. Akad. Wiss. Berlin, for 1836, (1838,) 281; tab. ii, f. 2.

AUD. & BACH. N. Am. Quad. III., 1854, 276, (not figured.)

SP. CH.—Smallest of North American species. Tail vertebræ, less than half the body; with the hairs not much more than half. Black, with broad white patch on forehead, and crescent before each ear; four parallel dorsal stripes interrupted and broken behind; a shorter stripe on side of belly, running into a posterior transverse crescent, which are all white. Tail black throughout, to base of hairs, except a pure white pencil at the end.

This little skunk is abundant in Santa Clara valley, south of San Francisco. They are commonly known by the name of pole cat, to distinguish them from the larger species of skunk. The peculiar smell seems somewhat less strong than in that species, but in habits they much resemble it, being very destructive to poultry and eggs, which their smaller size enables them to get at easily by entering the buildings at night. As an offset to this mischief they probably do much good by destroying the still more destructive "ground squirrels" of California, as I attempted to prove to the farmers. They are exactly suited in size for pursuing the squirrels into their holes, though I never heard that they had been seen doing so. Being nocturnal and able to see in the dark, they can take them also at a disadvantage—while they are asleep.

The one I obtained I poisoned with strychnine placed on meat in a hen house, which they were in the habit of frequenting nightly. They also often came to a butcher's shop to steal meat and feed on the offal thrown away from it. The eyeballs are excessively prominent, and shine after death with a fiery glare. The pupil is circular, and was much dilated, probably by the strychnine—length $5\frac{1}{2}$ inches; tail 4; iris black; nose flesh color.

TAXIDEA AMERICANA, Waterh.

Badger.

BAIRD, Gen. . Mammals, 1857, 202.

The American badger is very abundant in the plain country east of the Cascade mountains, its burrows perforating the ground thickly in many places to the great danger of both horses and riders. Yet our party never met with but two badgers by daylight, one of which I obtained. This, by the recommendation of some of the hunters, was cooked, but though some could eat it, the strong "doggy" flavor disgusted me, not to mention its extraordinary toughness and leanness. It is unknown west of the Cascade mountains, though in California a species is said to be found.

PROCYON HERNANDEZII, Wagler.

Black Footed Raccoon.

BAIRD, Gen. Rep. Mammals, 1857, 212.

The raccoon is not an abundant animal in any part of the Territory. I have but rarely seen their peculiar foot tracks in the mud, and never saw the animal itself in the woods. The skins are not often seen among the Indians. I had, however, an opportunity of observing a tame one at Portland, Oregon, which, as well as one I afterwards saw in California, had precisely the same habits, impatient cry, and sagacious inquisitiveness, as one which I once kept for many months, and allowed to have perfect liberty. The colors, size, and proportions also showed no appreciable differences.

Though this animal has a reputed fondness for oysters, I never saw any signs of its visiting the extensive beds at Shoalwater bay, though it sometimes walked along the banks of creeks emptying into the bay.

URSUS AMERICANUS, Pallas.

Black Bear.

BAIRD, Gen. Rep. Mammals, 1857, 225.

The common black bear of the United States is quite abundant in the wooded portions of the Territory, where it is found varying much in color, from which circumstance some authors have supposed that there was more than one species; I knew, however, of an instance of a black female being killed with a number of cubs, all differing in color. One of them, which I saw, was of a light yellowish hue. The color, then, does not even indicate a different race, as it varies in the young of one litter.

I have seen bears at a distance, but never got near one, which it is almost impossible to do without dogs, in the dense forests and thickets that they frequent. It is said that before lying down they always walk some distance with the wind, so that anything following their track must necessarily approach to windward and thus give them a chance to escape. From the abundance of "signs" in almost every thicket, and the quantities of berries devoured by them, they seem to be extremely common, and their food must be almost entirely vegetable. I have seen in low springy grounds a kind of "skunk cabbage" torn up by them and the leaf stalks devoured. They sometimes also take pigs and other small stock from the farmer, and devour the dead salmon on river banks in spring and fall. They are almost always fat, unlike their more carnivorous relatives. Several different shrubs are called "Bear berry"* and "Bear wood," from their fondness for the fruit, which is, I believe, in every instance uneatable by man.

URSUS HORIBILIS, Ord.

Grizzly Bear.

BAIRD, Gen. Rep. Mammals, 1857, 219.

The "Grizzly" is not found in the western wooded regions, nor, I believe, anywhere west of the Rocky mountains in this Territory.

PHOCA.

Seal.

Seals frequent the bays and rivers of the Territory in great numbers, ascending the Columbia

* *Arbutus Uva-Ursi*; *Xylosteum involucratum*; *Rhamnus Purshianus*.

to the Dalles, and the smaller streams almost to their heads, probably in pursuit of salmon. As they always sink, when shot in deep water, I never obtained a specimen. Many are killed by the settlers for their oil, and the Indians sometimes have a hunt for them, killing them while asleep on sand bars in the bays, but I never was present on one of these occasions in time to secure a skin, as they roast the animal with its skin on.

SCIURUS RICHARDSONII, Bach.

Richardson's Squirrel.

Sciurus richardsonii, BACHMAN, Pr. Zool. Soc. Lond. VI, 1838, 100.

AUD. & BACH. N. Am. Quad. I, 1849, 41.

BAIRD, Gen. Rep. Mammals, 1857, 273.

SP. CH.—Size larger than the Hudson's Bay squirrel. Ears with long hairs, presenting the appearance of tufts. Tail shorter than the body. Under surface of feet hairy from heel to metatarsals; then nearly naked. Above, reddish brown, varied with annulations of black, lighter on the sides; beneath, dull white; a dark line separating colors of sides from belly. Tail bushy, sub-cylindrical, dark reddish brown in the centre, entirely of a pure glossy black at tip. The hairs all long and coarse. Hairs on the tail generally, (except at tip,) glossy black beyond the rufous portion, and more or less tipped with paler rusty.

One specimen of this species (No. 10) was obtained on the Spokane river, October 30, 1853.

SCIURUS DOUGLASSII, Bach.

Oregon Red Squirrel.

Sciurus douglassii, ("GRAY,")¹ BACHMAN, Pr. Zool. Soc. Lond. VI, 1838, 99.

("BACH.") AUD. & BACH. N. Am. Quad. I, 1849, 370; pl. xlviii.

BAIRD, Gen. Rep. Mammals, 1857, 275.

Sciurus belcheri, J. E. GRAY, Ann. & Mag. N. H. X, 1842, 263.—*Id.* Zoology of the Sulphur, 1844, 33; pl. xii, fig. 2.

Sciurus suckleyi, BAIRD, Proc. Acad. Nat. Sc. Phila. VII, April, 1855, 333.

Size that of *Sciurus hudsonius*, or a little larger. Ears well tufted; tail shorter than the body, scarcely flattened. Soles naked in the centre. Above dull rusty, and black, mixed; the latter quite predominant; beneath, clear bright buff, without mixture of dark or annulated hairs. A dark stripe on the sides. Tail dull chestnut centrally, darker above; then black and margined all round with rusty white. Hairs at tip of tail entirely black, except at their extremity.

More northern specimens in winter have the soles densely hairy to the toes, the fur much fuller and softer, the under parts with dusky annulations, the general hue grayer. Size about that of *S. hudsonius*, or a little larger. Head short, broad. Whiskers longer than the head; black. Thumb, a mere callosity; fingers well developed, the central two longest, and nearly equal; the inner rather longer than the outer; claws large, compressed, and much curved; palms naked. On the hind feet the inner toe is shortest, reaching only to the base of the claw of the outer, which comes next in size; the fourth is longest, the third and second little shorter. Claws all large and much curved. In summer the soles are naked, except along the edges and the extreme heel; in other words, there is a narrow central line of naked skin from near the heel; they are more hairy in winter. The ears are moderate, with short close hairs on their concavity; the back of the ear is covered with long hairs, those near the upper margin longest, and projecting beyond nearly five lines in some specimens; these tufts are nearly black. The tail is small, shorter than the body, moderately flattened; the hairs rather short, and, as on the rest of the body, coarse and stiff.

The little Pine Squirrel I found quite abundant in all the wooded parts of the Territory on both sides of the Cascade mountains, and obtained specimens from very distant localities which seemed to agree closely in habits, cries, and colors. They have the same loud and petulant chatter as the eastern species, and descend, fearlessly, to within a few feet of every intruder, scolding and showing their anger in various ways. In the mild climate, west of the Cascade mountains, they do not hybernate, but as they are found also on the summits of these mountains, they probably there retire for winter, to hollow trees, and live on their hoarded stock of provisions.

In summer they inhabit nests of leaves and sticks built among branches and vines. They do not seem to be troublesome to the farmer, as they live on the pine nuts, acorns and hazel nuts abundant in the woods. Probably if Indian corn was a common crop they would not be long in discovering its valuable properties.

The only difference in the color of the male and female seems to be a deeper hue of the orange colored under parts of the latter.

Length from nose to tip of tail, 14 inches.

PTEROMYS OREGONENSIS, Bach.

Columbia River Flying Squirrel.

Pteromys oregonensis, BACHMAN, Jour. Acad. Nat. Sc. Phila. VIII, 1839, 101.—IB. in Townsend's Narrative, 1839.

AUD. & BACH. N. Am. Quod. I, 1849, 133; plate x

BAIRD, Gen. Rep. Mammals, 1857, 290.

SP. CH.—Much larger than *Pteromys volucella*. Tail, with hairs, longer than the body alone; shorter than head and body. Flying membrane very broad, its antero-external corner exhibiting a conspicuous angle. Color above yellowish brown, beneath dull white; the hairs plumbeous at base. Tail becoming more plumbeous towards the tip. Length, 7 inches; tail with hairs, $6\frac{1}{4}$; hind foot, $1\frac{1}{2}$ inches.

The only specimens I ever saw were obtained in August, near the foot of Mount St. Helens. In turning over a log, a nest was found under it containing four young, still blind. The mother in attempting to escape was killed by a pistol ball, and was lost before I could see it. It was much larger than the *P. volucella* of the eastern States. I never heard of one having been seen in the country nearer the coast, and think it is confined to the mountains.

TAMIAS TOWNSENDII.

Townsend's Striped Squirrel.

Tamias townsendii, BACHMAN, Jour. Phila. Acad. Nat. Sc. Phila. VIII, 1, 1839, 68.—IB. in Townsend's Narrative, 1839, 321.

AUD. & BACH. N. Am. Quad. I, 1849, 159; pl. xx.

BAIRD, Gen. Rep. Mammals, 1857, 301.

Tamias cooperii, BAIRD, Pr. Ac. Nat. Sc. Phila. VII, April, 1855, 334.

SP. CH.—Larger than *T. striatus*. Tail, with hairs, nearly or quite as long as the body. Sides of head striped. Above and on the sides rufous brown, with five dark stripes reaching to the tail, the intervals between which are scarcely or but seldom paler than the ground color; beneath, dull white. Ears dusky brown, hoary posteriorly. Tail bright chestnut beneath, margined with ashy white, within which is a band of black. Length 5 to 6 inches. Hind foot 1.40 to 1.50.

Varies in rather paler colors, ash-colored interspaces, and sometimes the back with black hairs interspersed, so as to obscure or nearly conceal the dorsal stripes.

The ground squirrel, or "chipmunk," inhabiting the neighborhood of the coast in Washington Territory, resembles closely in its habits that common on the Atlantic border. It differs, however, considerably in colors, and has not the shrill cry of the eastern species. About the first of April it emerges from its winter nest and soon after great numbers are seen where none appeared before. In summer they will often sit on some prominent stump or rock, and make a shrill barking noise for hours together, answering each other from distant parts of the woods. They become very mischievous in the garden, being especially fond of peas either green or ripe, for which they will come from their burrows several rods distant, as I have observed from the scattered pea-vines growing along the path where they have dropped the seed from their overloaded cheek-pouches. In November they retire to their burrows to sleep through the long rainy season, though it is probable that in the warm weather, often occurring in the winter of this coast, they come out to breathe the fresh air from time to time.

The ground squirrels obtained on the summit of the Cascade mountains differ in some respects from those near the coast. As I observed these animals in abundance in all the wooded regions, and saw no marked differences in their appearance or habits, I supposed all to be of one species, varying slightly in size and colors from differences of climate, which, between the perpetual

spring of the western regions and the edges of perpetual snow on the mountains, would be equal to many degrees of latitude on the eastern coast, and judging from analogous facts should have an influence on these characters. Their principal food on the eastern slopes of the Cascade mountains was the pine nut, and during September I observed them very busy extracting these from the still hanging cones, ascending the trees to a considerable height, though at other times they rarely leave the ground. I find it stated in my notes that they had there a similar shrill cry to that of the eastern species.

Specimens from Shoalwater bay measure: male, head and body, $5\frac{1}{2}$ inches; tail, 4 to 5 inches; head, $1\frac{1}{2}$; ear, $\frac{3}{8}$ — $\frac{4}{8}$. From Steilacoom, Puget's Island: male, $5\frac{1}{2}$; tail, $4\frac{1}{2}$; fore leg $2\frac{1}{2}$; hind leg, 3 inches. Female, 6; tail, 4; fore leg, 3; hind leg, $3\frac{1}{2}$ inches.

SPERMOPHILUS BEECHEYI.

California Ground Squirrel.

Arctomys (Spermophilus) beecheyi, RICHARDSON, Fauna Boreali-Americana, I, 1829, 170; plate xii, B.

Spermophilus beecheyi, F. CUVIER, Suppl. Buffon, I, Mamm. 1831, 331.

BAIRD, Pr. A. N. Sc. Phil. VII, 1855, 334.—IB. Gen. Rep. Mammals, 1857, 307.

SP. CH.—Size of the cat squirrel, *S. cinereus*. Ears large, prominent. Tail more than two-thirds as long as the body. Above mixed black, yellowish brown, and brown in indistinct mottlings; beneath, pale yellowish brown. Sides of head and neck, hoary yellowish, more or less lined with black, a more distinct stripe of the same, from behind the ears on each side, extending above the shoulders to the middle of the body. Ears black on their inner face. Dorsal space between the stripes scarcely darker than the rest of the back. Length, 9 to 11 inches; tail, with hairs, 7 to 9. Hind feet, 2 to 2.30 inches.

The marmot squirrel, called ground squirrel in Santa Clara valley, is found in incredible numbers in all the level or low land southward from San Francisco bay. It is one of the greatest pests to the farmer, destroying immense quantities of grain, and in spite of poisoning, drowning-out, shooting, and trapping, seems rather to increase than diminish in numbers. In travelling along the public road in a stage coach they are to be seen on every side, sitting boldly at the mouth of their burrow as the vehicle passes within a few yards, as if defying danger, those furthest off raised on their hind legs to have a better view, and looking like short gray stumps, so motionless do they sit.

If one is fired at it disappears as if by magic, and even if you are fortunate enough to shoot it at a distance from any burrow, it will spend its last breath in the attempt to reach one, so that unless its head is shot off by a rifle ball, the chance of getting it is very small. But they may often be recovered by feeling for them with the ramrod when dead near the mouth of the burrow.

They are very fine eating, and formerly sold well in San Francisco market, but since strychnine has been used to kill them, no one will buy them for fear of being poisoned.

When startled and about to run into their burrow, they make a shrill screaming cry, somewhat like that of our eastern striped squirrel, when frightened.

It is said that these animals will often destroy 30 or 40 acres of wheat in a field, cutting off the heads and leaving none behind in their progress. Magazines of theirs are found in digging wells, thirty feet below the surface, and from the large pile of earth thrown out at the mouth of their burrows they must be very extensive. There are commonly two or three entrances near together, which probably communicate, and in many places these holes occur every few yards, so that there may be several hundred in an acre, and many appear to inhabit one burrow.

They are very hard to drive away from their homes, remaining in the fenced gardens and about houses until they are killed. Being entirely diurnal in habits, and appearing most abundantly in the hottest part of the day, they are exposed to many enemies besides man, and

it is wonderful how they continue so numerous. Except in the very lowest ground, overflowed by tides, there is no part of Santa Clara valley where they cannot be seen at any time, scampering over the ground and watching at their burrows. Where it is practicable, the farmers combine in the commencement of the rainy season and build dams in the water courses, so as to overflow the land and drown out the squirrels.

Length 10 inches; tail 7 inches.

SPERMOPHILUS LATERALIS, Rich.

Say's Striped Squirrel.

BAIRD, Gen. Rep. Mammals, 1857, 312.

I shot a single specimen of a striped squirrel, near the eastern base of Mount Adams, in August, 1853, where it was in company with the common *Tamias*, which swarms in those pine forests. Its large size and something peculiar in its general appearance induced me to shoot it, and I have now no doubt that it was this animal. I unfortunately lost the specimen, and did not meet with another. It was excessively fat.

APLODONTIA LEPORINA, Rich.

Sewellel.

BAIRD, Gen. Rep. Mammals, 1857, 353.

The "Sewellel" of Lewis & Clark, appears to be an abundant animal in some districts west of the Cascade mountains, but from various causes I never could obtain a specimen. At the time of their visit to the country the Indians used the skins as clothing, and as it required a large number of skins to make an ordinary sized blanket, the numbers of the animals caught must have been great. It was caught by stone fall-traps, but with what bait I do not know, probably some root. The Indians assured me that none were found nearer to the coast than the Cowlitz valley, but as they have been obtained at Astoria, the statement was not altogether correct. They seem to prefer the soft alluvial river bottoms, where they are said to burrow, and probably thus follow down the Columbia. Now they are rarely caught by the Indians, as their skins are not bought by the Hudson's Bay Company, except when passed off on a "green" clerk as muskrat skins. Of their habits I could learn little. An old Indian hunter, who is now a shepherd in the employ of Dr. Tolmie at Puget's Sound, told him that he had frequently seen them running over the snow in the Nisqually valley, so that they probably do not hibernate. A young man who had kept school at Astoria told me that the children sometimes caught them about the school house, where they burrowed, and that they could be caught by running after them, as they did not run fast. When taken they did not offer to bite, and ate vegetable food readily. The specimen sent from there was found drowned in a tanner's vat.

CASTOR CANADENSIS, Kuhl.

Beaver.

BAIRD, Gen. Rep. Mammals, 1857, 355

The beaver is abundant in many of the streams of the wooded regions, and is said to have become more so since trapping has become unprofitable. Near the coast they live in the close vicinity of farms, but are very rarely seen. I have often watched at evening, hoping to see them at work, but they never appeared. The only one I ever obtained was while descending the Chehalis river, where, about sunrise, one of the Indians saw it swimming close to the bank, with

only its nose above water. He shot it, and on getting it into the canoe it proved to be a very large one, extremely fat. We soon after landed, skinned, and cooked it, the Indians considering it a great delicacy, but, though hungry, I thought it barely eatable. A fishy flavor pervaded every part of it, and it was very tough. The Indians were much disappointed at my keeping the tail with the skin, as they are very fond of it; but the taste that can fancy such a compound of gristle and fish oil must be acquired by long trials.

Dimensions of specimen. Head and body, 3 feet long. Tail, one foot long, $4\frac{5}{8}$ inches wide, $3\frac{1}{2}$ inches round at root. Eye black. Skull preserved. Female.

In California I saw a much larger skull of a beaver from the San Joaquin, but resembling this exactly in other respects. It is in the collection of the California Academy of Sciences.

JACULUS HUDSONIUS.

Jumping Mouse.

Dipus hudsonius, ZIMMERMANN, Geographische Geschichte, 1780, 358, (based on Pennant's long-legged mouse of Hudson's Bay.)

Meriones hudsonius, AUD. & BACH. N. Am. Quad. II, 1851, 251. ♦

Jaculus hudsonius, BAIRD, Gen. Rep. Mammals, 1857, 430.

SP. CH.—Above, light yellowish brown, lined finely with black; entire sides yellowish rusty, sharply defined against the colors of the back and belly. Beneath, pure white; feet and under surface of tail, whitish. Body measuring 2.75 to 3.50 inches; tail, 4.50 to 6.00 inches; hind feet, 1.10 to 1.30 inches.

A single specimen of this species was collected in Washington Territory.

HESPEROMYS GAMBELII, Baird.

Western Deer Mouse.

BAIRD, Gen. Rep. Mammals, 1857, 464.

SP. CH.—Very similar to *H. leucopus* in size and proportions. Ears larger, feet shorter. Tail generally a little less than head and body. Above, yellowish brown, much mixed with dusky, but without a distinct broad wash of darker on the back. Entire exterior of fore leg below the shoulder, white.

This wood mouse is common in the forest regions. Near the coast, where the common mouse has not been introduced, it takes up its residence in houses, and is quite as mischievous as the latter. It has, however, one habit not observed in that species—that of making stores of provisions in any place it finds suitable, though with little apparent foresight. It is not uncommon in the morning to find a handful of rice, &c., in your boots, and often it has been brought a considerable distance during the night, showing that several mice must have been industriously employed in collecting it. They will also make a storehouse of your bed while you are asleep, piling the grain about your feet, but never biting or awaking you. It is strange that though you may empty out their stores every day, they are sure to make another deposit each night for weeks.

HESPEROMYS AUSTERUS, Baird.

Black Mouse.

Hesperomys austerus, BAIRD, Pr. A. N. Sc. Phila. VII, April, 1855, 336.—*Id.* Gen. Rep. Mammals, 1857, 466.

SP. CH.—Fur full and soft; rather smaller than *H. leucopus*; feet larger in proportion.

Young, dark slaty plumbeous. Adult, dark sooty brown, slightly pervaded by yellowish brown on the cheeks and lower part of the sides, the dusky of the sides extending even in the adult to the wrist; both feet above, and under parts, white; tail well haired, as long as head and body, lower half white.

I obtained a specimen of this mouse at the camp August 11, on top of the Cascade mountains.

This drowned itself in a pail of water. At this time there was ice formed every night at our camp.

The second specimen I obtained was also found drowned in a pail of water at our camp on the great Spokane Plain, October 31, 1853. There being no trees within many miles of us, this species probably lives entirely among the grass of the prairies. As we had snow and severe frosts at that time, it probably remains active all winter.

HESPEROMYS BOYLII, Baird.

Long Tailed Mouse.

BAIRD, Gen. Rep. Mammals, 1857, 471.

SP. CH.—Body stout. Ears very large, almost naked. Tail stout, considerably longer than head and body, with long hairs at the end, and 32 vertebræ. Above, mixed brown and yellowish brown; paler on the sides. Outside of fore leg colored to the wrist.

One specimen was collected at Shoalwater Bay, Washington Territory.

HESPEROMYS CALIFORNICUS.

Mus californicus, GAMBLE, Pr. A. N. Sc. Phila. IV, August, 1848, 78, (Monterey.)

Hesperomys californicus, BAIRD, Gen. Rep. Mammals, 1857, 478.

SP. CH.—Very large. Size of a third grown rat. Ears very long, angular. Tail rather longer than body. Color above, sooty brown, passing on the sides to fulvous. Under parts white, tinged with fulvous and ashy. Feet white. Tail brown, a littler darker on the dorsal line. Soles entirely naked.

In a trap set for wood rats I caught, one night, a mouse, which though very similar in proportions and appearance to the rat, proved to be quite different, and even of another genus. I afterwards got two more of them from an old rat's nest that I burned down. There were three or four in it, and they remained until there was scarcely a stick unburnt before deserting it. No rats were in this nest, and I have always found that not more than one or two of those surrounding a tree were inhabited by them, the rest having a dilapidated appearance, and being left to their smaller relatives, these wood mice and field mice.

Of the habits of this wood mouse I know nothing further. They probably much resemble those of the numerous species found in the United States. I may remark here that up to my departure from California, on December 1, I saw no signs of hybernation of any of the small rodentia, except a striped squirrel, which I only saw out once, and having watched often afterward, concluded it had retired for the winter. There was then very little frost.

Dimensions.—Nose to tail, $4\frac{1}{2}$ inches. Tail, $4\frac{3}{4}$. Hind foot, 1 inch. Fore foot to wrist, $\frac{1}{4}$ inch. Ear, $\frac{3}{8}$ inch long, $\frac{5}{8}$ wide.

NEOTOMA FUSCIPES, Cooper, Mss.

BAIRD, Gen. Rep. Mammals, 1857, 495. (From Mss. of J. G. Cooper.)

SP. CH.—Larger than the house rat (*Mus decumanus*). Tail nearly as long as the head and body, compressed at tip. Color above, yellowish rusty brown, lined with black. Beneath, soiled white. Hands and toes of hind feet white; the upper part of metatarsus dusky. Tail uniformly dusky all round.

I found the wood rat of California extremely common in all those parts of Santa Clara valley more or less covered with groves of oak and different shrubs. Almost every tree, either of the evergreen or deciduous species of oak, had from one to six of their buildings under it. These are built of short sticks, chips, and sometimes bones, piled with such skill as to shed rain—the upper layers projecting downwards. Their form is conical, and height generally from four to five feet, having about six entrances at the ground, and burrows extending beneath it as a retreat

in case their house is demolished.* I tore down several, but could not by that means obtain any of the rats, though, from the warmth of their nest, they had evidently just left it. This nest is composed of fine grass, bark, and leaves, is about large enough to fill a hat, and placed near the middle of the building, about a foot above the ground. By means of galleries and openings like windows in the sides of the pile, they watch the approach of danger from their nest without being seen.

I succeeded in shooting several rats at last, by burning down their houses, and watching for them as they came out. They would stay till the last moment—often until they were much singed. If another nest was near, they ran for it; if not, ascended the nearest tree, and sat stupidly gazing at the destruction of their home, dazzled by the blaze.

I also caught some in a steel trap, baited with biscuit, of which they seemed very fond. They are mostly nocturnal in habits, but sometimes come out in the daytime, when all around is quiet, and then fall a prey to the numerous hawks that are watching for them and the squirrels. This wood rat lays up large stores of acorns, &c., in hollow trees, and has been known to kill, and carry to this retreat, a whole brood of chickens. It is, however, not very troublesome to the farmer, and never makes its residence in houses.

All that I obtained from their nests were males, and in no nest did I find more than two together. The females probably have a nest in hollow trees, where they produce their young, as I was told that they were sometimes driven out with the young clinging to them, as do those of the wood mouse. A hunter told me that when encamped near these rats' nests, he once had a large quantity of ship biscuit stolen by them, and for a long time he suspected the Indians of the theft, until he thought of searching the premises of his four-legged neighbors, where he found the whole of the plunder carefully piled away.

I found these rats quite active up to the 1st of December, and their hybernation is short, if any, in the lower valleys.

Size.—Nose to tail, 9 inches; tail, 8 to $8\frac{1}{2}$; circumference at root, 1 inch. Hind foot, $1\frac{1}{4}$ inches; fore foot to elbow, $2\frac{1}{4}$. Ear, 1 inch long, $1\frac{1}{4}$ wide. Head, $2\frac{1}{2}$ inches long.

NEOTOMA OCCIDENTALIS, Cooper.

Bush-tailed Rat.

Neotoma occidentalis, (Cooper MSS.,) BAIRD, Pr. A. N. Sc. Phila. VII, April, 1855, 335.

BAIRD, Gen. Rep. Mammals, 1857, 496.

Neotoma drummondii, AUD. & BACH., N. Am. Quad. I, 1849, 223; pl. xxix.

Sp. Ch.—Size of Norway rat. Fur harsh. Tail densely hairy, the vertebræ as long or longer than the body, exclusive of the head. Color above, broadly grayish lead color, the basal wool but little lighter. Posterior third of soles furred. Body above, brownish plumbeous, with a slight mixture of yellowish brown. Under parts of body and tail, with feet, bluish white.

The "wood rat," as it is called near the coast, inhabits the wooded regions west of the Cascade mountains, but is more abundant in some places than others. I did not hear of it at Puget's Sound, where I inquired for it. At the Cascades of the Columbia I was first told of such an animal, and am inclined to think it prefers the mountains rather than a level country, like that at the Sound and Vancouver. At Shoalwater bay, in July, 1854, I first obtained a specimen. Having occasion to sleep in a log house, at the foot of some high hills, the owner told me that the wood rats were very troublesome to him, eating everything vegetable they could get at, and carrying off articles that they could not use. The house being uninhabited most of the time, we found on entering that they had made a nest on the bedstead,

* An Australian rat of a different genus is described as building houses of the same kind.—(*Hapalotis conditor*, Gould)

and collected a pile of fresh elder leaves, grass, and other food, together with a pair of broken iron hinges, brushes, bones, and other useless articles. We saw none until night, when they began to come in, and one climbed up to the bed, where, finding strangers in possession, he retired behind a rough board with which the joints of the logs were covered inside. Here he kept up a curious ticking sound for some time as if to show his anger at our intrusion. Having got a light, I watched him through a crack, but could not see how he made the "mysterious rapping." I then sharpened a stick and speared him with it as he sat.

Afterwards a family of these rats took up their residence in a house where I lived. They had much the same mischievous habits as the common rat, but were less cunning. I could only catch them in traps by placing these in their way, as they refused cheese, bread, and other baits. We finally succeeded in killing the whole family of seven, which were all full grown. One poisoned itself by eating part of a bird skin preserved with arsenic. We afterwards found the nest made of oakum among a pile of flour barrels. A strong and disagreeable smell was perceptible about it. I never heard these rats squeal or make any sound when frightened or wounded.

The largest specimen measured as follows: Male, head and body, 10 inches. Tail, $8\frac{1}{2}$. Fore leg, $4\frac{3}{4}$; hind leg, $5\frac{1}{4}$ inches. Ear, 1 inch long, $1\frac{1}{4}$ wide. Female smaller.

ARVICOLA TOWNSENDII, Bachman.

Oregon Ground Mouse.

Arvicola townsendii, BACHMAN, J. A. N. Sc., Phila. VIII, 1, 1839, 60.—IB. In Townsend's Narrative, 1830, 315.

WAGNER, Wiegmann's Archiv. 1843, II, 53.

AUD. & BACH. N. Am. Quad. III, 1853, 209; pl. cxliv, fig. 1.

BAIRD, Gen. Rep. Mammals, 1857, 527.

SP. CH.—Very large, (head and body $5\frac{1}{2}$ inches.) Ears large; two-thirds as long as hind foot; well furred. Tail, including the hairs, rather less than half the head and body; the tail vertebrae twice the length of hind foot. Thumb claw conspicuous. Toes long; one-third the whole foot. Fur measuring a little over one-third of an inch, with a slight gloss. Above, dark fuscous brown, with but little yellowish brown visible. Sides paler; beneath, ashy white. Tail almost uniformly brown throughout. Feet liver brown. Skull, $1.27 \div 71$, or as $100 : 56$.

This meadow mouse is abundant on the meadows of Shoalwater bay, where it appears to have much the same habits as the species common in the Atlantic States. It forms summer nests of grass on the surface of the ground, commonly close to a root or log. Though I have frequently examined these, I never found young in them. It also makes galleries or paths through the grass, cutting off closely every stalk that stands in the way. During the annual floods which cover these meadows, great numbers of mice come out on the higher grounds, and thousands are doubtlessly drowned, which assists their many animated enemies in keeping down the numbers of a prolific and destructive animal.

ARVICOLA OREGONI, Bachman.

Arvicola oregoni, BACHMAN, J. A. N. Sc. Phila. VIII, 1, 1839, 60.—IB. in Townsend's Narrative, 1839, 315.

AUD. & BACH. N. Am. Quad. III, 1853, 232; pl. cxlvii, f. 3.

BAIRD, Gen. Rep. Mammals, 1857, 537.

SP. CH.—About the size and shape of *Arvicola pinetorum* ($3\frac{1}{2}$ inches). Skull .92. Fur short (.3 of an inch). Head short, broad. Ears moderate, barely concealed, quite naked, with a few scattered inconspicuous white hairs. Antitragus small. Tail vertebrae not one-third the head and body, longer than the head, one and one-half times the hind feet. Soles hairy for posterior third (.65 long).

Above, dark brown, without any rufous tint. Hairs with obscure tips of yellowish brown. Beneath, lustrous hoary plumbeous ash. Tail corresponding in color to the body, but not sharply bicolored. Feet grayish brown.

One specimen of this species was collected at Shoalwater bay.

FIBER ZIBETHECUS, Cuv.

Muskrat.

BAIRD, Gen. Rep. Mammals, 1857, 561.

The muskrat appears to be rather scarce in the western portions of the Territory, where I never saw any signs of their existence. I have been told, however, by credible persons that they were sometimes found, though scarce.

I can only account for this scarcity of an animal so abundant even in the thickly settled portions of the Atlantic States, by supposing that the beaver, where abundant, keeps them away. We find many instances of animals of similar habits thus holding possession by the right of the strongest; of which I will only cite one example among rodentia, that of the Norway rat, which has so far dispossessed every native species in countries where it has been introduced.

LEPUS WASHINGTONII, Baird.

Red Hare

Lepus washingtonii, BAIRD, Pr. A. N. Sc. Phil. VII, April, 1855, 333.—*Id.* Gen. Rep. Mammals, 1857, 583.

Ears shorter than the head; hind feet much longer than the head. Size about that of *L. sylvaticus*, or a little larger. Fur very soft and full on the body and beneath the feet. Tail very short. Back, sides, and throat reddish brown; the former with many glossy black hairs. Tail lead color above, rusty white beneath. Abdomen pure white. Ears black on the posterior margin and tip of their inner surface; the rest of this surface pale reddish brown, except on the exterior band.

This small species of hare seems peculiar to the forest region west of the Cascade mountains. I have never found it common, however, at any point except about Fort Vancouver or the Columbia, where, on account of the dense bushes they frequented, I found it very difficult to shoot them. They also occur on the borders of prairies in other western parts of the Territory, but are nowhere so abundant as the little Virginian hare is in the rural districts of the middle States. I observed them in winter, when the ground was covered with snow, and there was then no change in their color. A species with black ears and tail is said to be found at the Cascades of the Columbia. During our journey east of the Cascade mountains we saw scarcely any hares, and the Indians told us that some disease had killed nearly all of them. Dimensions of specimen: length, 17 inches.

LEPUS TROWBRIDGII, Baird.

Lepus trowbridgii, BAIRD, Pr. A. N. Sc. Phila. VII. April 1855, 333.—*Id.* Gen. Rep. Mammals, 1857, 608.

SP. CH.—Size small, less than that of *L. auduboni*. Head small. Ears about equal to it in length. Tail very short, almost rudimentary; hind feet very short, well furred, considerably shorter than the head. Color above, yellowish brown and dark brown; beneath, plumbeous gray. Sides not conspicuously different from the back, but paler. Back of neck pale rusty. Ears grayish and black on the external band; ashy gray elsewhere, with little indication of darker margin or tip.

The little hare, or "rabbit," of California, abounds in bushy, dry ground in Santa Clara Valley, and has much the same habits and appearance as the common Virginia hare in the middle States. It sits during day under the shelter of some thicket, and about dusk ventures out cautiously to feed. If started, it runs a short distance only, seeking the nearest concealment—unlike the large species, which trust more to their speed for escape. It is easy to shoot numbers of these little animals, either early in the morning or evening, by watching near their resorts. I have never observed them about wet grounds, and it is said that they do not frequent the hills, like the large hares, but keep entirely in the level prairies.

Length, 13 to 15 inches. Ear, 3 inches. Heel, 3 inches. Fore leg, below elbow joint, $3\frac{1}{2}$. Head, 3 inches.

I was told of another kind of small rabbit of a bluish tint, shorter ears, and which burrowed in the ground, but I could not get any. The accounts of it were also conflicting.

CERVUS CANADENSIS, Erx1.

Elk.

BAIRD, Gen Rep. Mammals, 1857, 537.

The elk is abundant in the dense forests of the Coast Range, and found in less numbers in the other wooded portions of the Territory. It is very wary, and difficult to kill at most times, but is often shot on the small prairies, near the heads of rivers, where it feeds in the evening and early morning. In severe winters, also, when they leave the mountains, and in large herds descend to the warmer prairies along the coast, they are tracked in the snow to their lairs, and shot. Many frequent these prairies every winter, returning in early spring to the mountains. In some places the Indians formerly surrounded the herds, and by gradually narrowing their circle, succeeded in killing many. It is almost useless to hunt them in the forest, where the dense underbrush gives them every advantage over their pursuer.

An intelligent farmer, who formerly hunted elk in New York State, told me that he considered these a different animal, being much larger, and having larger and differently formed horns.

CERVUS COLUMBIANUS, Rich.

Black-tailed Deer.

Cervus macrotis, var. *columbianus*, RICHARDSON, F. B. Am. I, 1829, 255; pl. xx.

Cervus columbianus, BAIRD, Gen. Rep. Mammals, 1857, 659.

SP. CH.—About the size of *C. virginianus*, or less. Horns doubly dichotomous, the forks nearly equal. Ears more than half the length of the tail. Gland of the hind leg about one-sixth of the distance between the articulating surfaces of the bone. Tail cylindrical, hairy and white beneath; almost entirely black above. The under portion of the tip not black. Winter coat with distinct yellowish chestnut annulation on a dark ground. Without white patch on the buttocks. There is a distinct dusky horse-shoe mark on the forehead anterior to the eyes.

I have only seen one species of deer in the Territory, and this only west of the Cascade range. It is not abundant, except in a few places, the most remarkable of which is Whitby's island, at the Straits of De Fuca, where extensive and luxuriant prairies support large numbers of them, now, however, becoming scarce under the continual slaughter kept up at all seasons by the settlers.

While there, in March, 1855, I saw a great many frequently in open daylight, but more commonly at dusk. The fact observed by Lewis and Clark, that when started they always go away by a succession of jumps, with all four feet striking the ground at once, I have often noticed, but have also seen them trot very leisurely away when they perceived the hunter at some distance off. A mottled, and sometimes entirely white variety, is not uncommon on this island and on the coast. I preserved a perfect specimen of this deer.

Dimensions.—Nose to tip of tail, 5 feet 8 inches; tail, 11 inches; height at shoulder, 3 feet. Male: Iris dark brown, horns budding.

CHAPTER II.

REPORT BY DR. GEO. SUCKLEY, U. S. A.

SOREX TROWBRIDGII, Baird.

BAIRD, Gen. Rep. Mammals, 57, 13.

SP. CH.—Above, sooty brown, slightly variegated with hoary; beneath a little paler, but differing only slightly from the back. Head and body $2\frac{1}{2}$ inches; tail 2, hind feet over .5 of an inch.

Two specimens were procured at Steilacoom.

SOREX SUCKLEYI, Baird.

BAIRD, Gen. Rep. Mammals, 1857, 18.

SP. CH.—Above, light chestnut brown; beneath, greyish white. Length $2\frac{1}{4}$ inches; tail $1\frac{1}{4}$. Hind foot .46 of an inch.

Two specimens were procured at Fort Steilacoom, where it is not rare. (One numbered 24.)

SCALOPS TOWNSENDII, Bach.

Oregon Mole.

Scalops townsendii, BACH. J. A. N. S. Ph. VIII, 1839, 58.—IB. in Townsend's Narr. 1839, 314.

AUD. & BACH. N. A. Quad. III, 1853, 217; pl. cxlv.

BAIRD, Gen. Rep. Mammals, 1857, 65.

SP. CH.—Teeth 44. Eye small, but not covered by the integument. Tail rather scantily haired. Nostrils opening on the upper surface of the tip of the snout. Palm large and broad. Color nearly black, with faint purplish or sooty brown reflection. (Sometimes, perhaps, glossed with silvery?)

Four specimens collected at Steilacoom in 1856, (21, 85, 119.)

UROTRICHUS GIBBSII, Baird.

BAIRD, Gen. Rep. Mammals, 1857, 76.

Muzzle prolonged into a cylindrical tube, continued some distance beyond the incisors, terminating in a simple naked bulb. Nostrils cylindrical, opening in the side. Eyes and ears concealed. Tail long and hairy. Fore feet moderately large, shorter than the hind feet. Upper and under surfaces of both covered with small plates.

Tail as long as the body (exclusive of the head.) Color uniform dark sooty plumbeous. Body about $2\frac{1}{4}$ inches long.

A specimen was collected July 15, 1854, by Mr. Geo. Gibbs, in White River Pass of the Cascade mountains, Washington Territory, north of Mount Rainier. (15.)

FELIS CONCOLOR, Linn.

The American Panther.

Felis concolor, LINN. Mantissa, 1771, 522; pl. ii.

AUD. & BACH. N. A. Quad. II, 1851, 305; pl. xcvi, xcvi.

BAIRD, Gen. Rep. Mammals, 1857, 83.

SP. CH.—Body considerably larger than that of the common sheep. Tail more than half the length of head and body. General color above, a uniform pale brownish-yellow, finely mottled by dark tips to all the hairs. Beneath, dirty white. A black patch on the upper lip, separated from the nose by a triangular white space. Convexity of ear black; tip of tail dusky. No spots or blotches on the body in the adult; a few obsolete ones in the half-grown young. Kittens with the body densely spotted and the tail ringed.

Specimens of the young, (62, 69,) and of the adult (10, 115) were collected at Steilacoom. They are called panthers by the settlers, and are tolerably abundant, a half dozen having been obtained in the neighborhood within a year.

LYNX FASCIATUS, Raf.

Red Cat.

Lynx fasciatus, RAF. Am. Month. Mag. II, Nov. 1817, 46.

BAIRD, Gen. Rep. Mammals, 1857, 96.

Tiger cat, LEWIS & CLARK, Travels, II, 1814, 167.

SP. CH.—Fur very soft and full. Ears pencilled. Color, rich chesnut brown on the back, a little paler on the sides and on the throat. A dorsal darker band collar on throat, as dark as the sides. Region along central line of belly (rather narrow one) dull whitish, with dusky spots extending to lower part of sides. No spots or bands discernible on the upper part of sides. Ears black inside, with a very inconspicuous patch of grayish. Terminal third of tail above, black.

Specimens were obtained at Fort Steilacoom, (114, 97, 87, 63,) at Olympia, and at Port Townsend, W. T. (134.) This species is called *Pish Pish* by the Nisqually Indians.

CANIS OCCIDENTALIS, var. GRISEO-ALBUS.

Gray Wolf.

"*Canis (Lupus) griseus*, SABINE, in Franklin's Journal, 654." (Gray.)

AUD. & BACH. N. A. Quad. III, 1854, 279. (Gray.)

Canis (Lupus) occidentalis, var. *griseus*, RICH. F. B. A. I, 1829, 66. (Gray.)

Canis occidentalis, DEKAY, N. Y. Zool. I, 1842, 42; pl. xxvii, f. 2. (Gray.)

"*Canis (Lupus) albus*, SABINE, in Franklin's Jour. 652." (White.)

AUD. & BACH. N. A. Quad. II, 1851, 136; pl. lxxii. (White.)

var. β , RICH. F. B. A. I, 1829, 68. (White.)

Canis occidentalis, var. *griseo-albus*, BAIRD, Gen. Rep. Mammals, 1857, 104.

SP. CH.—Color of various shades from gray to white.

Four skins were obtained at Fort Dalles, O. T, in 1854, (47, 48, 49, 58.)

Mountain wolf shot on Fifteen Mile Creek, near Fort Dalles, in December.

These wolves are very abundant in the neighborhood of the sources of the streams flowing into the Columbia from the Cascade, and Blue mountains. In the winter, until March, they come down into the valleys, where they are very destructive to horses, hunting them singly or in packs. They destroy the largest horses by hamstringing them while running. This is their favorite way of hunting. They are about 3 feet high. A skin which I saw at Fort Vancouver was much lighter, but otherwise agreed with this specimen. It was from the Columbia, west of the Cascades.

CANIS OCCIDENTALIS, var. NUBILUS.

Dusky Wolf.

Canis nubilus, SAY, in Long's Exped. R. Mts. I, 1823, 168.

DOUGHTY's Cabinet Nat. Hist. II, 1832, 265; plate xxiii.

Canis occidentalis var. *nubilus*, BAIRD, Gen. Rep. Mammals, 1857, 111.

SP. CH.—Color, light sooty, or plumbeous brown.

One specimen obtained at Steilacoom, (66.)

CANIS LATRANS, Say.

Prairie Wolf; Coyote.

BAIRD, Gen. Rep. Mammals, 1857, 113.

A skin of the young of this species was obtained at Bois de Sioux, Minn., in 1853, and a skull in Washington Territory.

VULPES MACROURUS, Baird.

Prairie Fox.

Vulpes macrourus, BAIRD, in Stansbury's Exploration Great Salt Lake, (published June, 1852,) 309.—IB. Gen. Rep. Mammals, 1857, 130.

Vulpes utah, AUD. & BACH., Pr. A. N. Sc. Ph. V, for June 30, 1852, (published July, 1852,) 114.—IB. N. Am. Quad. III, 1853, 255; pl. cli.

? *Vulpes fulvus*, MAXIM. Reise, II, 1841, 98.

SP. CH.—In size, length of fur and tail, exceeding the *Vulpes fulvus*. Tail vertebræ, usually 18 inches in length; breadth between lateral hairs eight to nine inches. Colors of the light variety, similar to those of the red fox, but yellower, and with more white beneath.

Specimens were collected at Fort Dalles, O. T. (40, 43, 56,) and at Fort Boisé (25).

Dimensions of 43.—Male.

	Inches.	lines.
From snout to insertion of tail.....	24	0
tail to end of vertebræ of tail.....	15	6
same to end of hair.....	19	6
Length of ear (posteriorly).....	4	6
From root of ear, anteriorly, to tip of nose.....	6	0
Full stretch.....	45	

VULPES MACROURUS? var. DECUSSATUS.

Oregon Cross Fox.

BAIRD, Gen. Rep. Mammals, 1857, 127.

SP. CH.—Legs and belly black. Above, grayish, with dusky cross on shoulders.

Specimens were collected at Fort Dalles, O. T., January 1855, (57, 58.)

VULPES MACROURUS? var. CINEREO-ARGENTATUS.

Black or Silver Gray Fox.

BAIRD, Gen. Rep. Mammals, 1857, 128.

SP. CH.—Black; the hairs on the hind part of the back with silvery tips.

Two specimens collected at Fort Dalles in 1855, (41, 67.)

VULPES (UROCYON) VIRGINIANUS.

Gray Fox.

Canis virginianus, ERXLEBEN, Systema Regni-Animalis, 1777, 567 (from Catesby).

Vulpes virginianus, AUD. & BACH. N. A. Quad. I, 1849, 162; pl. xxi.

Vulpes (Urocyon) virginianus, BAIRD, Gen. Rep. Mammals, 1857, 138.

SP. CH.—Head and body a little over two feet in length. Tail rather more than half as long. Tail with a concealed mane of stiff bristly hairs. Prevailing color mixed hoary and black; convexity and base of ears, sides of neck, edge of belly, and considerable portion of fore legs rusty or cinnamon. Band encircling the muzzle, much dilated on the chin, black. Throat and lower half of face pure white. Tail hoary on the sides; a distinct stripe above and the tip black; rusty beneath.

Specimens obtained at Fort Vancouver in 1855, (54, 55.)

This fox is called Loot-zah by the Des Chutes Indians.

MUSTELA PENNANTII, Erxl.

Fisher; Black Cat.

Mustela pennantii, ERXLEBEN, Syst. An. 1777, 479. (Based on *Fisher* of Pennant.)

BAIRD, Gen. Rep. Mammals, 1857, 149.

Mustela canadensis, SCHREBER, Säugt. III, 1778, 492; tab. cxxxiv. (*Pekan* of Buffon.)

AUD. & BACH. N. A. Quad. I, 1849, 307; pl. xli.

SP. CH.—Legs, belly, tail, and hinder part of back, black; the back with an increasing proportion of grayish white to the head. Length, over two feet. Vertebrae of tail exceeding twelve inches.

Specimens were collected at Fort Dalles, (53,) and Steilacoom, (45.)

They are found quite plentifully in the thickly wooded districts, along the eastern and, probably, the western base of the Cascade Range, on the parallel of Fort Dalles. Their favorite localities are forests, in the neighborhood of streams.

MUSTELA AMERICANA, Turton.

American Sable; Pine Marten.

Mustela americanus, TURTON's Linnaeus, I, 1806, 60.

Mustela americana, BAIRD, Gen. Rep. Mammals, 1857, 152.

Mustela martes, JOS. SABINE, Zool. App. to Franklin's Journey, 1823, 651.

AUD. & BACH. N. A. Quad. III, 1853, 176; pl. cxxxviii, (Huron.)

SP. CH.—Legs and tail blackish. General color reddish yellow, clouded with black; above becoming lighter towards the head, which is sometimes white. A broad yellowish patch on the throat, widening below so as to touch the legs. Central line of belly sometimes yellowish. Tail vertebrae, about $\frac{1}{2}$ the head and body. Outstretched hind feet reach about to the middle of the tail with the hairs. Feet densely furred.

Specimens were obtained from Cape Flattery, (139;) Snoqualme river, O. T., (118,) and Fort Boisé, (26.)

PUTORIUS PUSILLUS.

Least Weasel.

Putorius vulgaris, RICH. F. B. A. I, 1829, 45.

Mustela pusilla, DEKAY, N. Y. Zool. I, 1842, 34; pl. xiv, f. 1.

Putorius pusillus, AUD. & BACH. N. A. Quad. II, 1851, 100; pl. lxiv.

BAIRD, Gen. Rep. Mammals, 1857, 159.

SP. CH.—Smallest of American weasels. Length about six inches to root of tail. Tail vertebrae one-fifth to one-sixth the head and body. The terminal hairs about one-third the vertebrae, which do not exceed two inches. Tail slender, not tufted at the tip. Above, almost liver brown; beneath, white. No distinct black tip to the tail, though this is sometimes darker.

Specimen collected at Steilacoom.

PUTORIUS CICOGNANII.

Small Brown Weasel.

Mustela cicognanii, BONAP. in Fauna Italica, Mamm. 1838. Under head of *Mustela boccamela*.

Putorius cicognanii, BAIRD, Gen. Rep. Mammals, 1857, 161.

Mustela fusca, AUD. & BACH., J. A. N. Sc. Philada. VIII, II, 1842, 288.

Putorius fuscus, AUD. & BACH., N. A. Quad. III, 1853, 234; pl. cxlviii.

SP. CH.—Length to tail, 8 inches or less. Tail vertebrae, one-third this length. Black of tail, two-fifths its length. Outstretched hind feet reach the end of the vertebrae. In summer, brown above, whitish beneath; edge of upper lip white. In winter, white; tail with black tip.

One specimen collected at Puget's Sound.

PUTORIUS RICHARDSONII.

Mustela richardsonii, BONAP. in Charlesworth's Mag. N. H. II, Jan. 1838, 38. ("M. erminea, RICH. F. B. A.")

Putorius richardsonii, BP. in RICH. Zool. Beechey's Voyage, 1839, Mammalia, 10.

BAIRD, Gen. Rep. Mammals, 1857, 164.

Putorius agilis, AUD. & BACH., N. A. Quad. III, 1853, 184; pl. cxi.

SP. CH.—Length to tail, 9 inches or less. Tail vertebræ about half this length. Black of tail nearly one-half to one-third its length. Outstretched hind feet reach to the middle of the tail (with hairs) or a little beyond. In summer, dark chestnut brown above; whitish beneath. Whole upper jaw brown. In winter, white. Tail with black tip.

Specimen collected at Fort Steilacoom, August 18, 1854. (20.)

Measurement when fresh.

Around the ears.....	3 inches.
From front of fore foot to the end of hind foot extreme extension.....	12½ "
Total from snout to tip of tail.....	15 "
Tail.....	6 "
Fore arm.....	¾ "
Around chest behind shoulders.....	3½ "

PUTORIUS LONGICAUDA.

Mustela longicauda, BONAP. in Charlesworth's Mag. N. H. II, Jan. 1838, 38. (Based on Richardson's description.)

Putorius longicauda, RICH. (ex BONAP.) Zoology Beechey's Voyage to Pacific, 1839. Mammalia, 10.

BAIRD, Gen. Rep. Mammals, 1857, 169.

Mustela (Putorius) erminea, RICH. F. B. A. I, 1829, 46. ("Carlton House variety, with long tail.")

SP. CH.—Length to tail about eleven inches. Tail vertebræ about half this length. Black of tail about one-fourth its length. Above, light olivaceous brown; beneath, brownish yellow; edge of upper lip and chin white. In winter, white; tail with black tip. Light space on belly much wider than in *P. noveboracensis*. Muzzle broad.

Milk river, Neb., August, 1853.

PUTORIUS VISON.

Common Mink.

"*Mustela lutreola*, FORSTER, Philos. Trans. LXII, 371."

"SABINE, in Franklin's Narr. 1823, 652."

Mustela vison, BRISSON, Quad. 1756, 246.

Putorius vison, GAPPER, Zool. Jour. V, 1830, 202.

DEKAY, N. Y. Zool. I, 1842, 37; pl. xi, f. 1.

AUD. & BACH. N. A. Quad. I, 1849, 250; pl. xxxiii.

BAIRD, Gen. Rep. Mammals, 1857, 177.

SP. CH.—Tail about half as long as the body. General color, rather dark brownish chestnut. Tail nearly black. End of chin white, but not the edge of the upper jaw.

Disputed island, near Vancouver's island, (64); Klamath Lake; Fort Steilacoom, August 10, (18;) Cape Flattery, (137, 146, 138, 140.)

ENHYDRA MARINA, Flem.

Sea Otter.

BAIRD, Gen. Rep. Mammals, 1857, 189.

The imperfect skin collected was procured at Steilacoom, although I could not learn its precise locality. Almost all the skins of this otter now gathered by the Hudson Bay Company, come from the Indians north of the 50th parallel.

MEPHITIS MEPHITICA.

Skunk.

Mephitis mephitis, BAIRD, Gen. Rep. Mammals, 1857, 195.

Viverra mephitis, SHAW, Museum Leverianum, 1792, 172; plate.—IB. Gen. Zool. I, 1800, 390.

Mephitis chinga, TIEDEMANN, Zool. I, 1808, 362. (In part.)

AUD. & BACH. N. A. Quad. I, 1849, 317; pl. xlii.

SP. CH.—Soles naked, except on the posterior third. Tail vertebræ half the length of head and body, with hairs considerably less. Color black; a narrow frontal line, a broad triangular nuchal patch, continuous with a narrow line on either side of the back nearly to the tail, and a tuft at the end of the tail, white. The dorsal stripes sometimes broader; sometimes wanting, as also the nuchal patch.

Bois de Sioux. (3.)

MEPHITIS OCCIDENTALIS, Baird.

California Skunk.

Mephitis occidentalis, BAIRD, Gen. Rep. Mammals, 1857, 194.

? *Mephitis mesomelas*, ST. HILAIRE, Voy. de la Venus, Zoologie, I, 1855, 133; plate.

SP. CH.—Size of a cat. Tail vertebræ two-thirds the length of head and body. Bony palate with small narrow emargination in the middle of its posterior edge. Color black, with a white nuchal patch, bifurcating behind and reaching to the tail, which is entirely black.

Fort Steilacoom.

TAXIDEA AMERICANA.

American Badger.

Ursus taxus, SCHREBER, Säugt. III, 1778, 520, fig. 142, B. (From Buffon.)

Meles taxus, var. β *americanus*, BODDAERT, Elenchus Anim. I, 1784, 136.

Meles americanus, ("BODD.") ZIMMERMANN, Pennant's Arktische Zoologie I, 1787, 74.

Taxidea americana, BAIRD, Gen. Rep. Mammals, 1857, 202.

Meles Labradoria, MEYER, Zool. Archv. II, 1796, 45.

AUD. & BACH. N. A. Quad. I. 1849, 360; pl. xlvii.

SP. CH.—Head grizzled gray, black on the end of snout, and along the eyes. A median white line from near the nose to the nape. Legs and a crescentic patch before the ears black. Cheeks and under parts generally white.

Three specimens were collected on the Upper Missouri.

PROCYON HERNANDEZII, Wagler.

Black-footed Raccoon.

Procyon hernandezii, WAGLER, Isis, XXIV, 1831, 514.

BAIRD, Gen. Rep. Mammals, 1857, 212.

SP. CH.—Larger than *P. lotor*. General color grayish white, with a tinge of yellowish; long hairs tipped with black. Under fur dark brown. A large oblique black patch on the side of the face continuous with a paler one under the chin. Sides and under part of the muzzle, posterior margin of the cheek patch, and the ear, whitish. Tail tapering to tip, with five or six annuli and the tip black; the annuli half as wide only as the rusty whitish interspaces. Hind feet exceeding four inches; the upper surface mostly dark brown. Naked part of the soles three inches.

Varies in lighter colors and substitution of rusty brown or chestnut for the black tints.

Fort Steilacoom; two specimens. No. 4, killed January 26.

URSUS AMERICANUS.

Black Bear.

BAIRD, Gen. Rep. Mammals, 1857, 225.

One skull collected at Steilacoom.

SCIURUS FOSSOR, Peale.

California Grey Squirrel.

Sciurus fessor, PEALE, Mamm. and Birds, U. S. Ex. Ex. 1848, 55.

AUD. & BACH. N. Am. Quad. III, 1854, 264; pl. cliii, f. 2.

BAIRD, Gen. Rep. Mammals, 1857, 264.

Sciurus heermanni, LECONTE, Pr. A. N. Sc. Phila. VI, Sept. 1852, 149.

SP. CH.—Size of *S. vulpinus*, but more slender. Tail vertebræ as long as the body, with the hairs, much longer. Five upper molars. Above, grizzled bluish grey and black; beneath, white, without any differently colored separating line. Tail black, with the exterior white; the whole under surface finely grizzled. Back of ears and adjacent tuft on the occiput, chestnut.

Fort Dalles, O. T., January, 1855.—(Nos. 36, 37, 38.)

No. 36; January 17, 1855.—Large grey squirrel of Lewis & Clark.

Ears long; fur of ears, on their anterior border, whitish and sparse; inside thinly covered with whitish; outside sparsely covered with fulvous fur. Edges of eyelids sparsely covered with yellowish white. Whiskers jet black. Tip of nose black, with a dark stripe leading to the forehead. Cheeks and throat white, tinged with fulvous, with a few fine black hairs interspersed on the cheeks. Fur of top of head (gray?) at the base, for one-half its length, then black, subterminally white, tipped with white, with some longer black hairs interspersed. Fur of the back the same, only longer, and with scattering long hairs of jet black. Inside of legs and the throat, chest, and belly, white. The hind legs have less white. In stroking smooth and flattening the tail a broad subterminal bar of black is seen its whole length on each side, followed by a tip or edging of white; two other lesser bars are found nearer the roots of the hair on each side of the median line, when the tail is flattened.

Female having young was seen March 25th.

Dimensions of fresh skin.

	Inches.	Lines.
Length of skin to root of tail.....	14	6
Tail, (vertebræ,) about.....	12	6
Including fur.....	15	6
Whiskers.....	2	9
Fur on middle of tail.....	3	.....
Breadth of tail.....	6	2

This squirrel inhabits the oak groves in the neighborhood of Fort Dalles, and is also found in the high pine trees in the neighborhood of the oaks.

Wasco name, *Cow ten*.

They are most excellent eating; and average, when full grown, 2 pounds in weight.

No. 37; January 18.—*Sciurus*; male.*Measurements.*

	Inches.	Lines.
Length from point of nose to the insertion of tail.....	11	3
From insertion of tail to end of vertebræ.....	10	7
Of hairy tip.....	14	.....
From tip of longest nail of fore foot to do. of hind foot, extreme stretch.....	20	.....
Length of ear, measured posteriorly.....	1	3
Of space between ears.....	1	4
From heel to end of longest nail of hind foot.....	3	2
th of head from occipital protub. to en of nose.....	3	.....
Length of whiskers.....	3	6
Space between eyes.....	1	6
Length of hand, including longest nail.....	1	9
Width of tail, spread out.....	7	.....
4th toe longest; weight, 2 lbs.		

No. 38; January 1.—Female.

	Inches.	Lines.
From point of nose to insertion of tail.....	11	6
From insertion of tail to end of vertebræ.....	11	.....
From same to end of hair.....	14	3
Extreme stretch.....	19	3
Weight, 2 lbs.		

SCIURUS RICHARDSONII, Bach.

Richardson's Squirrel.

Sciurus richardsonii, BACHMAN, Pr. Zool. Soc. Lond. VI, 1838, 100.—*IB.* Charlesworth's Mag. N. H. III, Aug. 1839, 385.—*IB.* Jour. Ac. N. Sc. Phil. VIII, 1, 1839, 64.—*IB.* Townsend's Narrative, 1839, 318.
AUD. & BACH. N. Am. Quad. I, 1849, 41; pl. v.
BAIRD, Gen. Rep. Mammals, 1857, 273.

SC. CH.—Size larger than the Hudson's Bay squirrel. Ears with long hairs, presenting the appearance of tufts. Tail shorter than the body. Under surface of feet hairy from heel to metatarsals, then nearly naked. Above, reddish brown, varied with annulations of black, lighter on the sides; beneath, dull white; a dark line separating colors of sides from belly. Tail bushy, sub-cylindrical, dark reddish brown in the centre, entirely of a pure glossy black at tip. The hairs all long and coarse. Hairs on the tail generally, (except at tip,) glossy black beyond the rufous portion, and more or less tipped with paler rusty.

Specimens collected at St. Mary's Mission in 1853.—(No. 3.)

SCIURUS DOUGLASSII, Bach.

Oregon Red Squirrel.

Sciurus douglassii, ("GRAY,") BACHMAN, Pr. Zool. Soc. Lond. VI, 1838, 99.—*IB.* Jour. Acad. Nat. Sc. Phila. VIII, 1, 1839, 63.—*IB.* Charlesworth's Mag. N. H. III, 1839, 331.—*IB.* Townsend's Narrative, 1829, 317.
WAGNER, Suppl. Schreb. Säug. III, 1843, 177.
SCHINZ, Syn. Mam. II, 1845, 10.
("BACH.") AUD. & BACH. N. Am. Quad. I, 1849, 370; pl. xlviii.
BAIRD, Gen. Rep. Mammals, 1857, 275.
Sciurus suckleyi, BAIRD, Proc. Acad. Nat. Sc. Phila. VII, April, 1855, 333.

Size that of *Sciurus hudsonius*, or a little larger. Ears well tufted; tail shorter than the body, scarcely flattened. Soles naked in the centre. Above, dull rusty and black, mixed; the latter quite predominant; beneath, clear bright buff, without mixture of dark or annulated hairs. A dark stripe on the sides. Tail dull chestnut centrally, darker above; then black and margined all round with rusty white. Hairs at tip of tail entirely black, except at their extremity.

More northern specimens in winter have the soles densely hairy to the toes, the fur much fuller and softer, the under parts with dusky annulations, the general hue grayer. Size about that of *S. hudsonius*, or a little larger. Head short, broad. Whiskers longer than the head; black. Thumb, a mere callosity; fingers well developed, the central two longest and nearly equal; the inner rather longer than the outer; claws large, compressed, and much curved; palms naked. On the hind feet the inner toe is shortest, reaching only to the base of the claw of the outer, which comes next in size; the fourth is longest, the third and second little shorter. Claws all large and much curved. In summer the soles are naked, except along the edges and the extreme heel; in other words, there is a narrow central line of naked skin from near the heel; they are more hairy in winter. The ears are moderate, with short close hairs on their concavity; the back of the ear is covered with long hairs, those near the upper margin longest, and projecting beyond nearly five lines in some specimens; these tufts are nearly black. The tail is small, shorter than the body, moderately flattened; the hairs rather short, and, as on the rest of the body, coarse and stiff.

Many specimens of this species were collected at Fort Steilacoom. The food of the present species differs from that of those collected in the Rocky mountains, (*S. richardsonii*), in being confined to the cone seeds of the fur and spruce, whereas in the Rocky mountains the squirrels live on the seeds of the red pine. Both species have the same habits and peculiarities of the red squirrel of the middle States, very familiarly chatting and "scolding" when disturbed by the presence of man, when they become easy prey to the gunner. I have observed them here in mid-winter running about in the woods as actively as in warm weather, and they, therefore, do not become torpid and hibernate. Specimen No. 13 was killed about the first of July.

TAMIAS QUADRIVITTATUS.

Missouri Striped Squirrel.

Sciurus quadrivittatus, SAY, in Long's Exped. R. Mts. II, 1823, 45.

Tamias quadrivittatus, WAGNER, Suppl. Schreb. III, 1843, 234.

AUD. & BACH. N. Am. Quad. I, 1849, 195; pl. xxiv.

BAIRD, Gen. Rep. Mammals, 1857, 297.

SP. CH.—Tail, with the hairs, nearly or quite as long as the body. A grayish white stripe along the top of the head, with branches passing above and below the eye. The stripe bordered above and below by darker ones, and separated behind the eye by a dark line. A gray or hoary patch behind the ears. Sides of body deep ferruginous; back with five about equidistant dark stripes, nearly black on the posterior part of the body, their intervals forming four grayish white lines of similar dimensions to them. Tail, when flattened out, ferruginous externally, then black, then ferruginous. Body beneath, dirty grayish white. Length, 4 to 5 inches. Hind foot, 1.20 inch.

Blue Mountains, O. T., October, 9, 1854.—(No. 30.)

This specimen measured 4.50 inches to the root of the tail; the tail 4.25. Another (lost) was of the same size.

TAMIAS TOWNSENDII.

Townsend's Striped Squirrel.

Tamias townsendii, BACHMAN, Jour. Phila. Acad. Nat. Sc. Phila. VIII, 1, 1839, 68.—*Id.* in Townsend's Narrative, 1839, 321.

WAGNER, Wiegmann's Archiv. 1843, II, 44.

AUD. & BACH. N. Am. Quad. I, 1849, 159; pl. xx.

BAIRD, Gen. Rep. Mammals, 1857, 301.

Tamias cooperii, BAIRD, Pr. Ac. Nat. Sc. Phila. VII, April, 1855, 334.

SP. CH.—Larger than *T. striatus*. Tail, with hairs, nearly or quite as long as the body. Sides of head striped. Above and on the sides rufous brown, with five dark stripes reaching to the tail, the intervals between which are scarcely or but seldom paler than the ground color; beneath, dull white. Ears dusky brown, hoary posteriorly. Tail bright chestnut beneath, margined with ashy white, within which is a band of black. Length 5 to 6 inches. Hind foot 1.40 to 1.50.

Varies in rather paler colors, ash-colored interspaces, and sometimes the back with black hairs interspersed, so as to obscure or nearly conceal the dorsal stripes.

Many specimens of this species were collected at Steilacoom. It hibernates in winter.

SPERMOPHILUS DOUGLASSII.

Columbia Ground Squirrel.

Arctomys Spermophilus douglassii, RICH. F. B. A. I, 1829, 172.*Spermophilus douglassii*, F. CUVIER, Suppl. Buff. I, Mamm. 1831, 333.

AUD. & BACH. N. Am. Quad. I, 1849, 373; pl. xlix.

BAIRD, Gen. Rep. Mammals, 1857, 309.

SP. CH.—Similar in most all respects to *S. beecheyi*, but with the space on the nape and back, between the light colored more lateral patches, of a uniform dark brown, nearly black.

Fort Dalles, O. T., January and April, 1855.—(39, 52.)

39. Squirrel or marmot, called at Fort Dalles the rock squirrel; Indian name, woskee. (Walla-Walla.) Ears extremely fulvous, with scattering, long, black hairs; inside well covered with pale brown, darker near the tip; anterior edges, extremely dark brown; posterior, pale. Eyelids, white. Face, brownish white, the hairs posteriorly becoming varied. Chin and fore throat, brownish white, becoming more foxy on the breast. The hairs of the latter are dusky at the base.

General aspect of back and sides.—Sides silvery from below the ears to false ribs. These silvery patches are separated on the back by a dark stripe about $\frac{3}{4}$ of an inch in width, along the middle from the forehead, running posteriorly to the posterior half of the body, where it becomes expanded into the general brown color of those parts. The whole is varied with irregular whitish and brown wavy lines, their interspersions giving in certain lights a mottled appearance. Tail, brownish white, each hair with 3 black bars. Inside of legs fulvous. They are exceedingly numerous about the Dalles, become very fat, and are excellent eating.

Dimensions.—Male.

	Inches.	Lines.
Length from point of nose to insertion of tail.....	12	
insertion of tail to end of vertebræ.....	3	3
hair.....	9	6
From tip of longest nail of hind foot to same of fore foot.....	15	9
Length of ear, measured posteriorly.....	1	2
From heel to longest third nail of hind foot.....	2	6
Between the eyes.....	1	
Length of head from occipital protuberance to end of nose.....	2	7
hand, including nail.....	1	6
fur from middle of back.....		7

Female.—April 7, 1855, No. 52.—Five teats on each side.

Dimensions.—Nose to insertion of tail, $10\frac{1}{2}$ inches. End of caudal vertebræ, $17\frac{3}{4}$ inches. End of hair, $19\frac{3}{4}$ inches.

SPERMOPHILUS TRIDECIM-LINEATUS.

Striped Prairie Squirrel.

Sciurus tridecem-lineatus, MITCHELL, Medical Repository, XXI, Jan. to June, 1821, 248.*Spermophilus tridecem-lineatus*, AUD & BACH. N. Am. Quad. I, 1849, 294; pl. xxxix.

BAIRD, Gen. Rep. Mammals, 1857, 316.

SP. CH.—About the size of *Sciurus hudsonius*. Ears very short. Tail vertebræ about half the length of body, or a little longer. Claws long; that of thumb rather diminutive. Above dark brown, with light stripes and lines of light spots alternating with each other, six of the former and five of the latter generally very distinct. Tail with a brownish yellow margin and tip, and within this a border of black. Length, 5 to 6 inches. Tail vertebræ, 3.50 to 4 inches. Hind foot 1.30 to 1.40.

Minewakan, Minnesota, and the upper Missouri.

CYNOMYS LUDOVICIANUS.

Missouri Prairie Dog.

Arctomys ludovicianus, ORD, Guthrie's Geog. 2d Am. Ed. II, 1815, 292, 302.

Spermophilus ludovicianus, "LESSON, Manual, 244, 658."

F. CUVIER, Suppl. Buffon, I, Mam. 1831, 316.

AUD. & BACH. N. Am. Quad. II. 1851, 319; pl. xcix.

Cynomys ludovicianus, BAIRD, Gen. Rep. Mammals, 1857, 331.

Size of fox squirrel, *Sc. vulpinus*, but heavier; ears very short, not projecting above fur. Tail short, with the hairs, about one-third the length of body. Claws long, very stout; the thumb of fore feet armed with a long claw instead of a flat nail. Soles with a patch of hair. Color above, reddish brown or cinnamon, with the tips of the hairs lighter and with scattered black hairs interspersed; beneath, brownish white or yellow. In winter of a more grayish cast above. Hairs on the upper part lead color at base, then pale cinnamon white to cinnamon. Tail like the back, its tip black, with the hair light colored at base. Length about 12 inches; tail, with hairs, 4 inches; hind foot about 2.25 inches.

Upper Missouri.

ARCTOMYS FLAVIVENTER, Bachman.

Yellow-Footed Marmot.

Arctomys flaviventer, AUD. & BACH. Pr. A. N. Sc. Phila. I, 1841.—In J. A. N. Sc. Phila. VIII, II, 1842, 309.—In N.

Am. Quad. III, 1853, 160; pl. cxxxiv.

BAIRD, Gen. Rep. Mammals, 1857, 343.

SP. CH.—Size of common woodchuck. Above, yellowish brown, somewhat grizzled with gray. Under parts of body and tail, and the legs all round, inside and out, reddish chestnut.

This specimen, (60) an adult female, was obtained on the north side of the Columbia, opposite Fort Dalles, May 20, 1855; is not found, so say the Indians, on the south side of the river, at least in the vicinity of Fort Dalles. They prefer rocky places; utter a shrill chirp or whistle when discovered.

Measurement of specimen No. 60, procured May 19, 1855.

	Inches.	Lines.
Length from tip of snout to insertion of tail.....	14	9
insertion of tail to tip of caudal vertebræ.....	4	6
end of vertebræ to tip of hair.....	2	0
hand to end of longest claw.....	1	7
heel " " ".....	2	10
tip of nose to angle of eye.....	1	6

Iris, hazel; muzzle and chin, hair short, grayish white. Hairs on crown of head, brown, some tipped with whitish. Scattering long black hairs are found interspersed. Fur on back of the neck, blackish brown at the base for $\frac{1}{2}$ an inch, then foxy, then dark brown, the greater portions are tipped with white, these white ends being of irregular length, a few are tipped with brownish black.

Hair on anterior portion of back, shorter as if worn off. Hairs of posterior portion of back similar to those of the neck, except that the brown is lighter and the general appearance more ferruginous. Fur of breast, shoulders, fore arm, inside of thighs, legs, and belly, foxy yellow, with lighter tips and darker bases in many situations. Soles of feet black. Tail, reddish brown above, some of the hairs near the insertion tipped with whitish. Under surface of tail darker. Posterior surface of ear sparsely covered with short grayish white hairs. The edges of the ears are black.

A light band in front of the eyes from lore to lore. Teeth white.

APLODONTIA LEPORINA, Rich.

Sewellel; Shotw'l.

BAIRD, Gen. Rep. Mammals, 1857, 353.

SP. CH.—Size of muskrat. Tail scarcely appreciable. Color reddish brown.

Three specimens collected at Steilacoom—(11, 93, 92.)

They are found in considerable numbers on the Cowlitz rivers, as well as in other localities near here. Being about the size of muskrats, their skins were formerly palmed off to the Hudson Bay Company's agents by the Indians as skins of that animal, thereby frequently deceiving the new and inexperienced employes of the company. Mr. Gibbs (who presented me with the specimen sent) has handed me the following notes concerning it:

"The specimen I send you was obtained at Seattle, where it was killed in a garden. Its name, in the Nisqually language, is Showt'l, (*Showhurll*, Suckley.) Color gray; hair short and coarse; legs short; eyes small; tail almost wanting. This animal burrows extensively in the ground. It chiefly frequents spring heads in rich moist places, and is found as far up as the dividing ridge of the Cascade mountains and on both sides of the divide. I noticed their burrows in 1853 at the top of the main Yakima pass. Near their abodes were small bundles of some herb or plant cut with nicety and laid out on logs to dry or wilt. The Indians trap them, and value their meat very much as food."

The Nisqually Indians formerly made garments by sewing together a number of the dried skins of this animal. They are caught generally by traps resembling in action our "figure 4" traps.

CASTOR CANADENSIS, Kuhl.

Beaver.

BAIRD, Gen. Rep. Mammals, 1857, 355.

Milk river, Neb.

DIPODOMYS PHILLIPPII, Gray.

BAIRD, Gen. Rep. Mammals, 1857, 412.

SP. CH.—Above yellowish brown; beneath white, with a white stripe across the thighs. Tail much longer than the body; black, with a white stripe on each side.

Walla-Walla, 1854, No. 51. Called Sim-tup-tup by the Wasco Indians. They are also found near the Dalles, at the bases of the eastern spurs of the Cascades mountains.

The Indians say that they find them most plentiful about the berry patches on the eastern slope of the Cascades. That from Walla-Walla was probably found in the Blue mountains.

THOMOMYS DOUGLASSII.

Columbia Gopher.

Geomys douglassii, RICH. F. Bor. Am. I, 1829, 200; pl. xviii, C, fig. 1-6. (Skull.)—IB. Zool. of Blossom, 1839, 12.
LECONTE, Pr. A. N. Sc. Phila. VI, 1852, 162.

Ascomys douglassii, WAGNER, Suppl. Schreb. III, 1843, 392.

Pseudostoma douglassii, AUD. & BACH. N. Am. Quad. III, 1853, 24; pl. cv.

Thomomys douglassii, GIEBEL, Säugt. 1855, 531.

BAIRD, Gen. Rep. Mammals, 1857, 394.

SP. CH.—Cheek pouches large; [sparsely haired on the outer wall. Tail, one-third to nearly one-half the body. Upper incisors nearly plane in front, with a distinct and sharp groove. Hand large; claws very large and stout; palm and digits

very short. Middle claw $5\frac{1}{2}$ lines above; below, occupying nearly two fifths of the hand; its toe about two-eighths. First finger or thumb very short, barely reaching over two-sixths the hand.

Color.—Above, dusky chestnut brown, but slightly mottled on sides and beneath with an ashy brown tinge. Cheek pouches whitish at the bottom, the line of demarcation indistinct, and the brownish color of the marginal region running down into the pouch. Tail grayish; dusky above.

Many specimens were collected at Fort Steilacoom, (8, 840;) also several at Fort Dalles, (59.)

No. 59, Female.—Dalles, April 25.

	Inches.	Lines.
Nose to insertion of tail.....	5	4
Tail	1	10
Nose to ear.....	1	4
Central claw of fore foot about.....		4
Extreme stretch.....	7	7

PEROGNATHUS FASCIATUS, P r. M a x.

Perognathus fasciatus, PR. MAX. Nova Acta C. L. C. Acad. XIX, 1, 1839, 369; tab. xxxiv.—IB. Reise innere Nord-Amerika, I, 1839, 449.

AUD. & BACH. N. Am. Quad. III, 1854, 341.

BAIRD, Gen. Rep. Mammals, 1857, 420.

SP. CH.—Considerably larger than the house mouse. Tail as long as the body without the head. Antitragus conspicuously lobed. Soles naked. Above reddish yellow, closely lined with black; fore legs all round, feet and under parts white; a pale reddish yellow immaculate band on each side.

This animal was found in the vicinity of Fort Union, Nebraska.

PEROGNATHUS MONTICOLA, B a i r d.

BAIRD, Gen. Rep. Mammals, 1857, 422.

SP. CH.—Antitragus lobed; soles naked. About as large as the domestic mouse. Tail rather shorter than the head and body, fully coated with hair. Hind feet rather short. Color above mixed cinnamon and dusky; flanks scarcely clearer, beneath white; tail colored to correspond with these regions. Hairs below, as well as above, plumbeous at base, those above exhibiting this color for nearly two-thirds their length. Outside of fore leg dusky to the wrist.

St. Mary's Mission, Rocky Mountains.

PEROGNATHUS FLAVUS, B a i r d.

Perognathus flavus, BAIRD, Pr. A. N. Sc. Phila. VII, April, 1855, 332.

Gen. Rep. Mammals, 1857, 423.

SP. CH.—Considerably less than the common mouse. Tail equal to or less than the head and body, scarcely different in color above and below. Hind feet short. Above, yellowish buff, with dusky tips to some of the hairs; clearer on the sides. Beneath, snowy white to the roots of the hair. Fore leg white to the shoulders. Hairs on the back plumbeous only on their basal half.

Found between Milk and Maria rivers, Nebraska.

JACULUS HUDSONIUS.

Jumping Mouse.

Dipus hudsonius, ZIMMERMANN, Geog. Geschichte, II, 1780, 358.

Meriones hudsonius, AUD. & BACH., N. Am. Quad. II, 1851, 251; pl. lxxxv.

Jaculus Hudsonius, BAIRD, Gen. Rep. Mammals, 1857, 430.

SP. CH.—Above, light yellowish brown, lined finely with black; entire sides yellowish rusty, sharply defined against the colors of the back and belly. Beneath, pure white; feet and under surface of tail whitish. Body, 2.75 to 3.50 inches; tail, 4.50 to 6.00; hind feet, 1.10 to 1.30.

Specimens collected at Steilacoom.

MUS DECUMANUS, P a l l a s.

Brown Rat; Norway Rat.

BAIRD, Gen. Rep. Mammals, 1857, 438.

This species was unknown at Steilacoom until about five years ago, when it was introduced

probably by the Hudson Bay Company's ships, and other merchant vessels. They are now exceedingly abundant in the storehouses of the Hudson Bay Company and the garrison. Before that, the hairy-tailed rat was alone found. The Indians (Nisqually) have given it the hairy-tailed rat's name, *Squawt hun*, or large mouse.—(No. 9.)

HESPEROMYS GAMBELII, Baird.

BAIRD, Gen. Rep. Mammals, 1857, 464.

SP. CH.—Tail a little less or about equal to head and body. Above, yellowish brown, much mixed with dusky, but without a distinct broad wash of darker on the back. Entire outside of fore leg, below the shoulders, white.

Fort Dalles, Oregon Territory, 1855.—(42.)

Dimensions.

	Inches.	Lines.
From point of nose to insertion of tail.....	3	10
Total length to tip of tail, (about)	7	6
Extreme stretch.....	5	2
Length of ear, measured posteriorly.....		7
Between ears.....		5½
Length of hand.....		5
From heel to longest toe of hind foot.....		9
Whiskers.....	1	3
Between eyes, measured from their convexities.....		6

HESPEROMYS AUSTERUS, Baird.

Oregon Mole.

BAIRD, Gen. Rep. Mammals, 1857, 466.

SP. CH.—Sooty brown, slightly mixed with yellowish brown on the cheeks and lower part of sides; the dusky color extending to the wrist. Feet and under parts white. Tail well haired, as long as head and body; lower half white.

Many specimens of this species were obtained at Steilacoom.—(4, 5, 22, 86.)

HESPEROMYS SONORIENSIS, Leconte.

Hesperomys sonoriensis, LECONTE, Pr. A. N. Sci. Phila. VI, October, 1853, 413. (Sonora.)

BAIRD, Gen. Rep. Mammals, 1857, 474.

Arvicola (Hesperomys) sonoriensis, AUD. & BACH. N. Am. Quad. III, 854, 296 (from Leconte.)

? *Mus leucopus*, RICH. Zool. Jour. III. 1828.—IB. F. B. Am. I, 1829 142.

SP. CH.—Young, light ashy gray; adult, with a tinge of yellow h brown; neither is there any dorsal stripe. Tail scarcely longer than the body, exclusive of the head. Posterior tubercle of sole small, rounded, far forward. Soles hairy for half their length. Tail white, except a narrow line above of dusky. Ears large, with long hairs; one-half of the ear hoary, in strong contrast with the dusky of the remaining portion.

Specimen obtained at St. Mary's Mission, Rocky mountains.

NEOTOMA OCCIDENTALIS, Cooper.

Bushy-tailed Rat.

BAIRD, Gen. Rep. Mammals, 1857, 496.

SP. CH.—Size of Norway rat. Fur harsh. Tail densely hairy; the vertebræ as long or longer than the body, without the head. Color above, brownish plumbeous, mixed with yellowish brown. Beneath, with feet, bluish white.

New Dungeness, Straits of de Fuca.—(149.)

NEOTOMA CINEREA.

Rocky Mountain Rat.

Neotoma drummondii, RICH. F. B. A. I, 1829, 137.

Neotoma cinerea, BAIRD, Gen. Rep. Mammals, 1857, 499.

SP. CH.—Size of Norway rat. Fur very soft. Tail densely hairy; the vertebræ shorter than the body, exclusive of head. Above, light yellowish brown, deeper on the sides. Beneath, with feet, snowy white.

Milk river, Nebraska.

ARVICOLA TOWNSENDII, Bachman.

Oregon Ground Mouse.

Arvicola townsendii, BACHMAN, J. A. N. Sc. Phila. VIII, 1, 1839, 60.—IB. In Townsend's Narrative, 1830, 315.

AUD. & BACH. N. Am. Quad. III, 1853, 209; pl. cxliv. fig. 1.

BAIRD, Gen. Rep. Mammals, 1857, 527.

SP. CH.—Very large, (head and body $5\frac{1}{2}$ inches.) Ears large; two-thirds as long as hind foot; well furred. Tail, including the hairs, rather less than half the head and body; tail vertebræ twice the length of hind foot. Thumb claw conspicuous. Toes long; one-third the whole foot. Fur measuring a little over one-third of an inch, with a slight gloss. Above, dark fuscous brown, with but little yellowish brown visible. Sides paler; beneath, ashy white. Tail almost uniformly brown throughout. Feet liver brown. Skull, $1.27 + 71$, or as $100 : 56$.

Puget's Sound, W. T., 1856.

The field mice of Washington Territory, with other vermin, are exceedingly destructive in the gardens. It is scarcely possible to raise either melons, cucumbers, pumpkins, or squash, owing to the depredations of these little animals. Seed after seed is planted, and as regularly dug up and eaten by them in a few days, scarcely one in many sowings being allowed to grow.

ARVICOLA OREGONI, Bachman.

Arvicola oregoni, BACHMAN, J. A. N. Sc. Phila. VIII, 1, 1839, 60.—IB. in Townsend's Narrative, 1839, 315.

AUD. & BACH. N. Am. Quad. III, 1853, 232; pl. cxlvii, f. 3.

Arvicola (Chilotus) oregoni, BAIRD, Gen. Rep. Mammals, 1857, 537.

SP. CH.—About the size and shape of *Arvicola pinetorum*, ($3\frac{1}{2}$ inches.) Skull .92. Fur short, (.3 of an inch.) Head short, broad. Ears moderate, barely concealed, quite naked, with a few scattered inconspicuous white hairs. Antitragus small. Tail vertebræ not one-third the head and body, longer than the head, one and one-half times the hind feet. Soles hairy for posterior third, (.65 long).

Above, dark brown, without any rufous tint. Hairs with obscure tips of yellowish brown. Beneath, lustrous hoary plumbeous ash. Tail corresponding in color to the body, but not sharply bicolored. Feet grayish brown.

Steilacoom, W. T., 1855.

FIBER ZIBETHICUS, Cuv.

Muskrat.

BAIRD, Gen. Rep. Mammals, 1857, 561.

Two specimens of the well known muskrat were collected at Steilacoom, (5, 117.) No. 5, killed January 28.

LEPUS WASHINGTONII, Baird.

Red Hare.

Lepus washingtonii, BAIRD, Pr. A. N. Sc. Phil. VII, April, 1855, 333.—IB. Gen. Rep. Mammals, 1857, 583.

Ears shorter than the head; hind feet much longer than the head. Size about that of *L. sylvaticus*, or a little larger. Fur very soft and full on the body and beneath the feet. Tail very short. Back, sides, and throat reddish brown; the former with many glossy black hairs. Tail lead color above, rusty white beneath. Abdomen pure white. Ears black on the posterior margin and tip of their inner surface; the rest of this surface pale reddish brown, except on the exterior band.

Specimens of this species were obtained at Steilacoom (7, 133), and at Vancouver. Two white winter skins and one summer (140, 144, 142) of this, or a closely allied species, were obtained from the latitude of $54^{\circ} 40'$.

LEPUS CAMPESTRIS, Bach.

Prairie Hare.

us campestris, BACH. J. A. N. Sc. Phila. VII, II, 1837, 349.—IB. VIII, I, 1839, 80.

BAIRD, Gen. Rep. Mammals, 1857, 585.

Lepus townsendii, BACHMAN, J. A. N. Sc. Phila. VIII, I, 90; pl. ii.

AUD. & BACH. N. Am. Quad. I, 1849, 25; pl. iii.

SP. CH.—Larger than *Lepus americanus*. Ears about one-fifth longer than the head. Fur soft and full, especially in winter. Tail as long as the head. Hind feet considerably longer than the head; somewhat longer than the ears.

In summer, back, rump, sides of limbs, external and internal bands of the ear, and the throat, yellowish gray, varied more or less with brown. Beneath, white. Tail entirely white, above and below; in some specimens only with a faint wash of ash above. Nape and interior surface of ears white, except as stated; the latter tipped with black.

In winter, pure white all over, with a yellowish tinge. Ears white, tipped with brown; the external and internal bands rusty gray. Fur on the ears and elsewhere much longer and fuller than in summer. Fur on the upper part and sides pure white on the basal half.

Missouri river, at Fort Union. No. 29 was obtained on Burnt river, of Snake river, O. T., on its left bank, one hundred miles north of Fort Boisé. It was a male, killed October 5; weight, $6\frac{1}{2}$ pounds; stretch, $38\frac{1}{2}$; tip of snout to end of tail, $25\frac{3}{4}$; tibia, 6; femur, 5; heels to end of toe, $5\frac{3}{4}$; from shoulder joint to tip of toes, 10.

This species is supposed to turn white in winter.

LEPUS CALIFORNICUS, Gray.

California Hare.

Lepus californicus, GRAY, Charlesw Mag. N. H. I, 1837, 586, (named only in Pr. Zool. Soc. Lond. IV, 1836, 88.)

AUD. & BACH. N. Am. Quad. III, 1853, 53; pl. cxii.

BAIRD, Gen. Rep. Mammals, 1857, 594

SP. CH.—Size large. Ears and hind feet much longer than the head, (the ears longest.) Tail as long as the head. Limbs elongated; not very densely furred. Fur rather soft. Upper parts light cinnamon and black. Sides of the body anteriorly, chest, and outer surfaces of limbs cinnamon, with a slight mixture of black. Under parts whitish cinnamon on the median line, darker externally and on the inner surfaces of the limbs. Tail dull cinnamon; the upper part and a line running up a short distance on the rump, black. Extremity of the dorsal surface of the ear, with the adjacent edges, black. Internal and external bands, dusky; rest of the dorsal surface of the ear, with the posterior edge, fulvous white; rest of the external surface, with the anterior fringe, pale cinnamon. Under surface of the head lighter than the chest. Bases of the hairs and fur above, grayish white; below, white; on the sides, light plumbeous. Nape, dusky grayish.

Fort Jones, California, (70.)

? LEPUS CALLOTIS, Wagler.

Jackass Rabbit; Texas Hare; Black-tailed Hare.

Lepus callotis, WAGLER, Nat. Syst. Amph. 1830, 25.—IB. Isis, 1831, 511.

AUD. & BACH. N. Am. Quad. II, 1851, 95; pl. lxiii.

BAIRD, Gen. Rep. Mammals, 1857, 590.

SP. CH.—Rather smaller than the European hare. Ears very long and broad; nearly one-third longer than the head and one-fifth longer than the hind foot. Hair on the buttocks short and close. Color above, yellowish gray, blotched and lined with black. Upper surface of tail and central line of rump, black; tail beneath, grayish white. Sides of rump, clear ash gray. Legs, ashy. Nape, black, (sometimes whitish?) Beneath, dull whitish, with a yellowish brown color on the throat. A light ring round the eye. Tip of the posterior surface of the ear black.

Boisé river, Oregon Territory, September 27, 1854.—27, 28.

No. 27.—Male; September 27th. Dimensions.—Stretch, $26\frac{1}{2}$. Fore arm, $3\frac{3}{4}$; tibia, $5\frac{1}{4}$; femur, $4\frac{1}{4}$. Ear from plane of occiput, $5\frac{1}{4}$. Heel to end of toes, $4\frac{7}{8}$. From snout to tip of tail, $22\frac{1}{2}$. From shoulder joint to tip of fore foot, 8 inches.

These hares are exceedingly abundant on the left bank of the Boisé river. They are so numerous, that our command of 60 men subsisted on them for nearly a week. In a short ride of an hour's duration to see 30 near to the trail was nothing remarkable. The natives (Diggers) make garments by sewing many of their skins together. This hare breeds in great numbers on the vast sage plains to the south of Boisé river, between it and Snake river. They are said to turn white in the winter. The flesh is rather bitter, owing probably to the sage on which it feeds.

LEPUS ARTEMISIA, Bachman.

Sage Rabbit.

BAIRD, Gen. Rep. Mammals, 1857, 602.

SP. CH.—Similar to the common rabbit, *Lepus sylvaticus*, but smaller and grayer.

Fort Union, Nebraska.

Fort Dalles, Oregon Territory, 1855.—35, 50.

50.—March 2. Length to root of tail, 12 inches; tail to end of vertebræ, 2.00; of hairs, 2.50.

35.—January 12, 55. Under surface of tail, I am told by Indians, is white; that of this specimen was lost. It does not turn white in winter. Name, in dialect of the Wascos, *La-Lik*.

Dimensions.

	Inches.	Lines.
Length from nose to root of tail.....	15	.....
Heel to point of longest nail.....	3	8
Height of ear above plane of crown.....	3	3
Ear to point of nose.....	2	10
Tail vertebræ, about.....	1	4
From olecranon to end of longest nail.....	4	2
Extreme stretch between fore and hind toes.....	24	.....

Ear as long as the head. Small intestines; about 6 feet 9 inches long; stomach, about 3; cæcum very long. Ileum contained 4 tæniæ.

ALCE AMERICANA, Jardine.

Moose.

BAIRD, Gen. Rep. Mammals, 1857, 631.

Horns were obtained from some point north of Steilacoom.

CERVUS CANADENSIS, Erxleben.

Elk.

BAIRD, Gen. Rep. 1857, 638

A portion of a skull obtained in Washington Territory.

CERVUS LEUCURUS, Douglas.

White-tailed Deer.

Cervus leucurus, DOUGLASS, Zool. Jour. IV, Jan. 1829, 330.

RICHARDSON, F. Bor. Am. I, 1829, 258.

AUD. & BACH. N. Am. Quad. III. 1853, 77; plate cxviii.

BAIRD, Gen. Rep. Mammals, 1857, 649.

Long-tailed red deer, LEWIS & CLARK.

SP. CH.—Horns and gland of the hind legs as in *C. virginianus*; tail, appreciably longer; hoofs, long and narrow; fur, compact. General color above, in autumn, yellowish gray, clouded and waved, but not lined with dusky. Chin, entirely white, with only a small dusky spot on the edge of the lip. Ears gray, with a basal white spot behind. Anal region and under surface of the tail, but not the buttocks, white. Tail, reddish above, without exhibiting any dusky.

A pair of horns obtained from Whidby's Island.

CERVUS COLUMBIANUS, Rich.

Black-tailed Deer.

Cervus macrotis, var. *columbianus*, RICHARDSON, F. B. Am. I, 1829, 255; pl. xx.

Cervus columbianus, BAIRD, Gen. Rep. Mammals, 1857, 659.

Cervus lewisii, PEALE, Mammalia and Birds U. S. Ex. Ex. 1848, 39.

Cervus richardsonii, AUD. & BACH. N. Am. Quad. II, 1851, 211.—Ib. III, 1853, 27; pl. cvi.

Black-tailed fallow deer, LEWIS & CLARK.

SP. CH.—About the size of *C. virginianus*, or less. Horns doubly dichotomous, the forks nearly equal. Ears more than half the length of the tail. Gland of the hind leg about one-sixth of the distance between the articulating surfaces of the bone. Tail cylindrical, hairy and white beneath; almost entirely black above. The under portion of the tip not black. Winter coat with distinct yellowish chestnut annulation on a dark ground. Without white patch on the buttocks. There is a distinct dusky horse-shoe mark on the forehead anterior to the eyes.

Steilacoom, W. T., 1856. (90.)

APLOCERUS MONTANUS.

Mountain Goat.

Ovis montana, ORD, Guthrie's Geography (2d Am. Ed.) II, 1815, 292, 309.—Ib. J. A. N. Sc. I. 1, 1817, 8.

Aplocerus montanus, RICHARDSON, Zool. of Herald; Fossil Mammals, II, 1852, 131; pl. xvi-xix. Osteology.

BAIRD, Gen. Rep. Mammals, 1857, 671.

BAIRD, Rep. U. S. Pat. Off. Agricultural for 1851, (1852,) 120; plate. (From Rich.)

AUD. & BACH. N. Am. Quad. III, 1853, 128; pl. cxxviii.

Rocky Mountain Sheep, JAMESON, "Wernerian Transactions, III, 1821, 306."

Mountain Goat, *Mountain Sheep*, *White Goat*, &c. VULGO.

SP. CH.—Entirely white. Horns, hoofs, and edge of nostrils black. Hair long and pendant. A beard-like tuft of hair on the chin.

Three specimens were obtained in the Cascade mountains north of Mount Rainier, by Lieutenant Nugen, United States army; another from the Upper Nisqually. (89.)

Fig. 2.

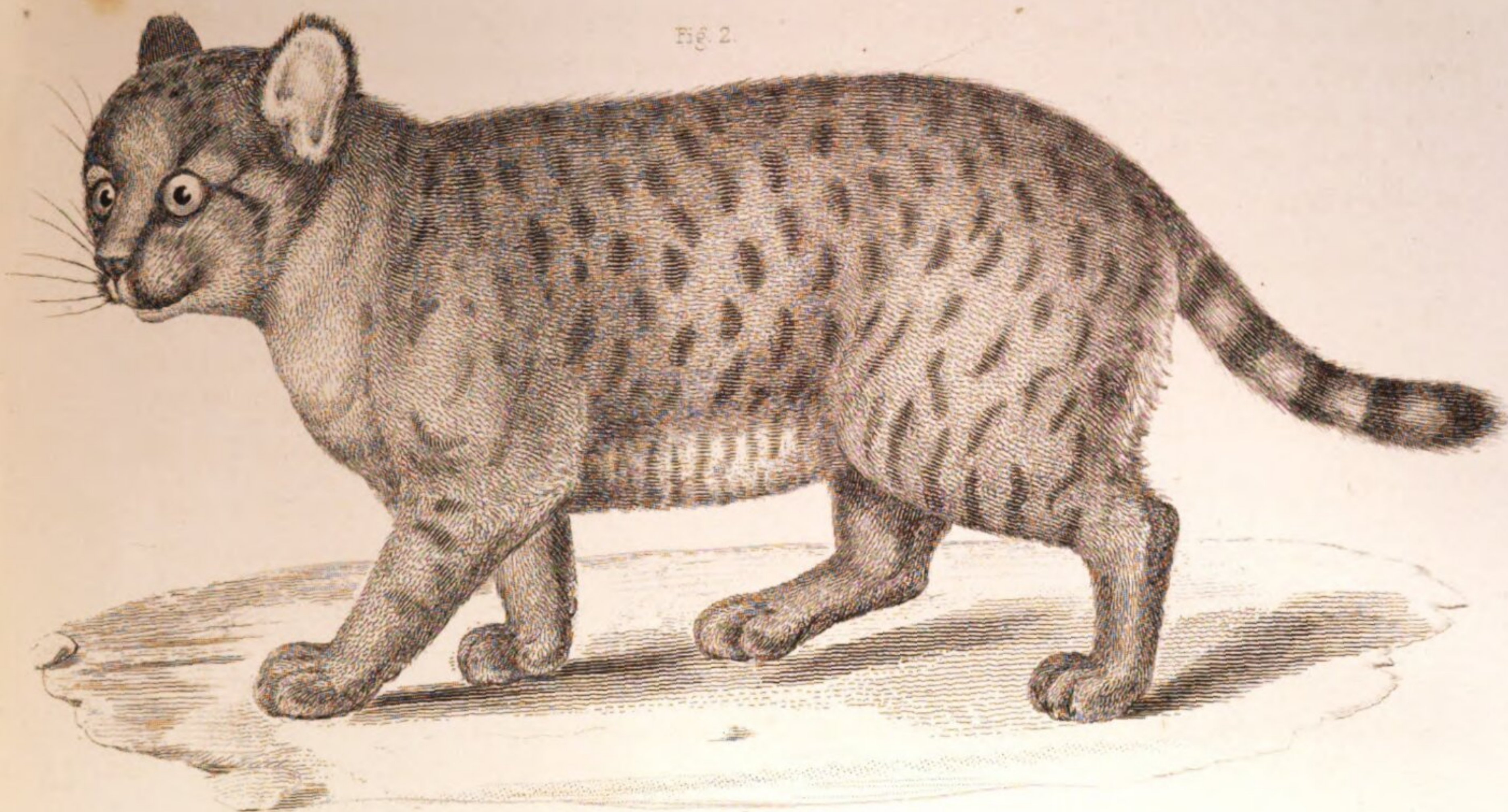


Fig. 1.

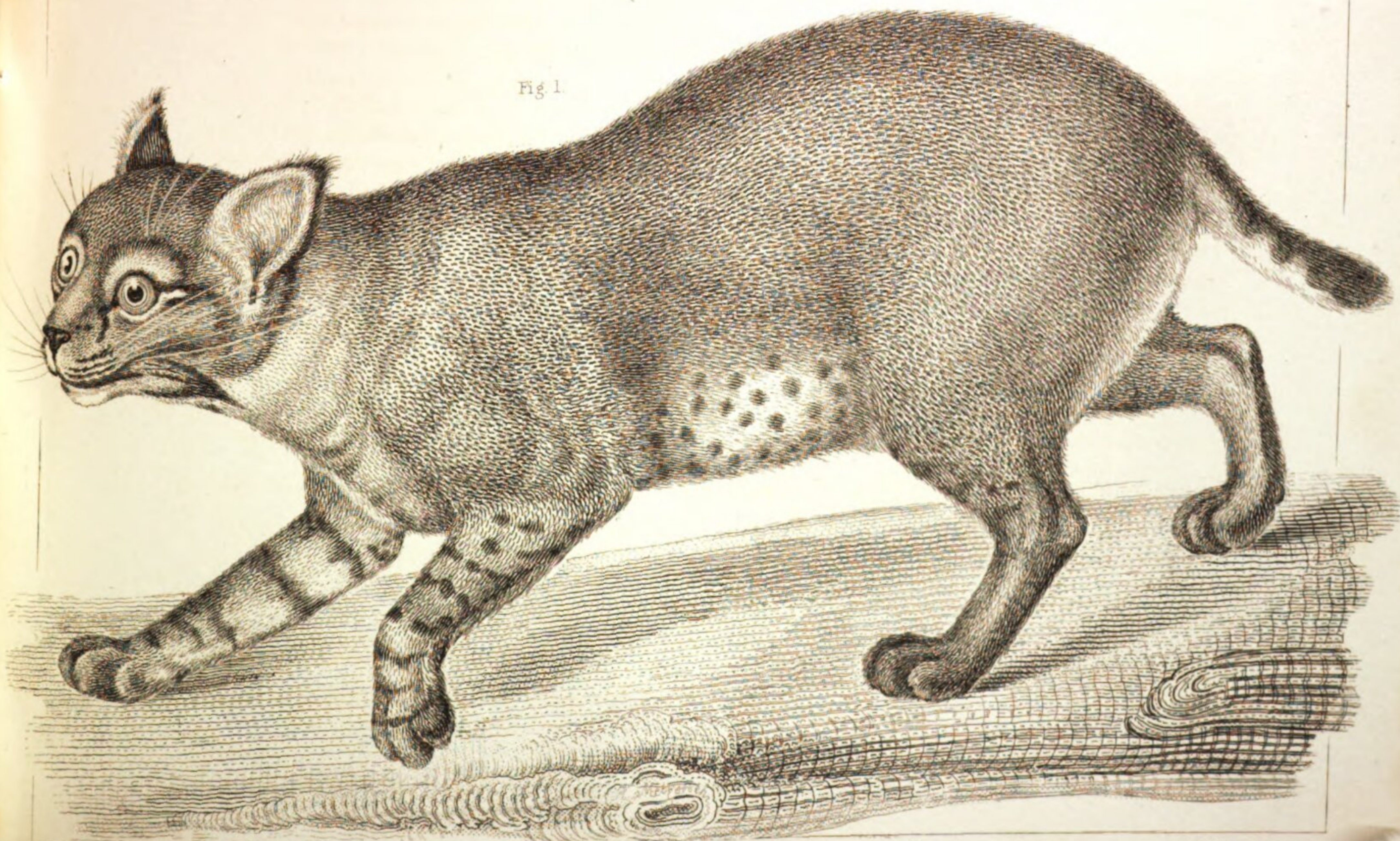




Fig. 1.



Fig. 2.





CHAPTER III.

REPORT OF DR. GEO. SUCKLEY, U. S. A., AND GEO. GIBBS, ESQ.

SCALOPS TOWNSENDII, Bach.

Western Mole.

BAIRD, Gen. Rep. Mammals, 1857, 65.

[For Sp. Ch. see chap. 2, p. 88.]

This animal is quite abundant in the vicinity of Puget Sound, and probably extends throughout those portions of Oregon and Washington Territories situated between the Cascade range and the coast. I never saw it east of the Cascades.

It is very common near Puget Sound, where I got a half dozen specimens. One, obtained alive at Muckleshoot prairie, I kept for some time in a box, upon the bottom of which was a quantity of rich black loam. When disturbed it instinctively endeavored to escape by burrowing in the earth of the box, using its long pointed nose as a wedge to pioneer the way. The excavation was performed by its broad stout hands, which, surmounted with their long sharp claws, seemed admirably adapted for the purpose. The fore paws were worked alternately as in swimming, the hind feet acting as propellers. Although the earth in the box was very soft and friable, it was, nevertheless, a matter of astonishment to see how rapidly the little creature could travel through it. When he slept it was in a sitting posture, with the body curled forward and the neck strongly flexed, so that the nose rested between the hind legs. He thus assumed a *ball* shape, evidently his usual natural position when asleep.

This mole, being subsequently killed, was duly measured, and the measurements recorded in my note book, as follows:

No. 85.	♂.	Length from nose to base of tail	6.75
		Length of tail	1.50
		From occiput to tip of nose	2.00
		Length of hand, including middle nail	1.10
		Extreme reach from longest claw of hind foot to ditto of fore foot	7.87

Penis concealed in its sheath. Glans flattened. Eyes scarcely apparent before skinning.

They live in the more rich and open grounds, making burrows near the surface resembling closely those made by the common garden mole in the Atlantic States.—S.

NOTE.—During Dr. Suckley's absence from the United States, chapter 2 of the present section was published. It was found afterwards that many notes and memoranda had been mislaid, or had, from some other cause, escaped insertion. It was therefore determined to join the unpublished material with a number of valuable notes which had been kindly furnished by George Gibbs, esq., and to print the whole, as thus connected, in the present chapter. Care has been taken to avoid useless repetition of any of the matter which appears in chapter 2, but when necessary, a reference is made to the page in the first report, as well as to that of Professor Baird's general report on the mammals of the routes of the different surveys.—S.

CONDYLURA?

Star-nosed Mole.

In 1852 I saw a very large star-nosed mole, which had been killed at Orleans bar, on Klamath river.—G.

Dr. Cooper saw at Vancouver, W. T., in 1853, a decayed specimen, which had the appearance of having a radiated excrescence on the nose; but being crushed and nearly destroyed, the specimen was unfit for preservation.

FELIS CONCOLOR, Linn.

The American Panther; Cougar; California Lion.

Felis concolor, LINN. Mantissa, 1771, 522; pl. II.

BAIRD, Gen. Rep. Mammals, 1857, 83.

[For Sp. Ch. see chap. 2, p. 88.]

The cougar, or, as it is frequently called, "California lion," is common in Oregon and Washington Territories. They are quite abundant in the mountains of the Klamath. The Indians there sew two skins together, and wear the robe thus formed as a blanket, the tails trailing behind. Two skins of the young panther were obtained by me from a man at Steilacoom. They are marked much like the wild cat, but have a longer tail. The living animals were about the size of weaned kittens.—G.

NOTE.—I have several times heard of some large animal of the cat kind said to differ from the cougar. One was reported to have been seen in California by some mining acquaintances I made there. It was described as stouter than the cougar, *deep chested*, with a *dark tawny mane*! Lately a very intelligent man, Mr. Samuel Woodward, of Shoalwater bay, W. T., informed me that he had seen in that neighborhood an animal standing higher upon its legs than a cougar, with erect ears and a *short tail*. The Indians of the Willamette have a story of some terrible animal inhabiting the woods bordering the Columbia on the south, which is not a cougar. It may be that there are imaginary differences, but the subject deserves investigation. Perhaps these animals are straggling specimens of the northern lynx.—G.

The cougar is quite abundant in the thickly wooded sections of Washington Territory, near the coast, being especially abundant on some of the heavily timbered river valleys, such as that of the Cowlitz, Chehalis, Nisqually, and others. Near Fort Steilacoom a few are killed every year, occasionally quite near the garrison. There have not, as yet, been any instances in that vicinity of human beings having been attacked by them. They are, however, destructive to young calves and other small animals. They are said to utter shrill screams, and at times loud *whistling* sounds, at night. Perhaps these, when much heard, proceed from the amatory conflicts and spiteful sanguinary courtships which, it is fair to suppose, exist as much among them as with their cousins, our domestic dependants.

I am indebted to Major James Tilton, United States surveyor general of Washington Territory, for the present of the finest and most complete skin of this species I have ever seen from the northwest coast. It is now in the collection of the Smithsonian Institution.

Townshend speaks of the indication of a second and nearly allied species on the Columbia. His opinion is based upon a peculiar skull and one foot of an animal he there obtained. Perhaps this may have belonged to the "terrible animal" to which Mr. Gibbs alludes. The

kitten skins obtained by Mr. Gibbs were got in August; and it is fair to suppose that they were littered in July. The Indians speaking the Nisqually dialect call this animal *swo-wah*.—S.

LYNX FASCIATUS, Raf.

Western Wild Cat; Red Cat.

Lynx fasciatus, Raf. Am. Month. Mag. II, Nov. 1817, 46.

BAIRD, Gen. Rep. Mammals, 1857, 96.

Tiger Cat, LEWIS & CLARK, Travels II, 1814, 167.

[For specific characters in detail of this species see chap. 2, p. 90.]

The western wild cat is abundant in the thickly wooded districts bordering the lower Columbia and Puget Sound. Lewis and Clark, in speaking of this animal, call it the "tiger cat," and say that it is much larger than that of the States, with much finer fur. They remark that the Indians made robes out of *four skins*.

The name of this animal in Yakima (a dialect of the Walla-Walla language) is *Pitzeni*, and in Nisqually *Pish-pish*. The older settlers say that there are two kinds of wild cat in the neighborhood of Puget Sound—one being the species now under consideration, the other called the *brindled cat*. I saw a specimen of the *L. fasciatus* at Olympia in 1856. It was about twice the size of the common wild cat. Tail short, ears black, with gray spots upon them like "thumb marks." The Skokomish Indians call it *Chebuk*. The Indians say that there are *two* cats besides the cougar, thus corroborating the statements of the settlers. A very intelligent settler, a keen hunter, and an observing man—Judge Ford, of the Chehalis river—says that there is a *third* kind, which is *spotted black and white*, and is much more slender than the common wild cat of the country.—G.

The barred lynx is a very abundant species in the thickly wooded districts of Washington Territory; so much so that I obtained a half dozen specimens during the last year I resided there. One of these (a female) was shot in a barnyard near Fort Steilacoom. It and a companion were standing near some calves, whisking their tails, and apparently bent upon mischief. It is not often that they attempt to take such large prey; but usually they content themselves with young pigs, or other small delicacies that may fall in their way near the settler's home. When not depending upon what can be stolen from the farmer or shepherd, they subsist upon young fawns, rabbits, ruffed grouse, small birds, squirrels, &c.

There *may* be two kinds of wild cats in the Territory north of the Columbia, the present species and the Hudson Bay lynx. The latter Townshend says inhabits Oregon. The Indians about Puget Sound, when asked, always say that there are *two lynxes* or *wild cats*. One of these they call *Bellopes*; but the *Bellopes* is the raccoon, (*Procyon hernandezii*.) Undoubtedly these natives have not studied comparative anatomy very extensively. After removing the *Bellopes* and asking how many other kinds of wild cats exist in their country, they answer *only one*, pointing to a skin of the red cat of the present article. The kind spoken of by Mr. Gibbs as having been seen by Judge Ford may perhaps be a partially grown cougar, which we know are spotted when young; or it may be a young individual of the Hudson Bay lynx, or even a new and undescribed species. I have friends on the lookout for the animal, so that, if at all abundant, I shall probably ere long receive a specimen.

The Indians eat the red lynx whenever obtained. Upon their recommendation I tried a *steak* broiled, but have no hesitation in pronouncing the creature not good. A prominent mark of this species is the gray "thumb mark" on the ears.

Measurements of specimens.

No. 121.—Fort Steilacoom, October 10, 1856. Female.

From nose to base of occiput	7.00 inches.
From nose to base of tail	33.50 "
Tail vertebræ	6.87 "
From base of tail to end of hairy tip	7.50 "
Span of fore and hind foot—extreme stretch	65.00 "
Easy girth behind shoulders	18.25 "

This cat was fat and in good order.

Another. No. 114 was a male killed in a farmer's yard, near Fort Steilacoom, August 8, 1856. It had committed many depredations upon the poultry and young pigs of the establishment.

From occiput to nose	6.50 inches.
From nose to base of tail	31.50 "
Tail vertebræ	6.75 "
Tail to end of hairy tip	7.25 "
Span of fore and hind legs—extreme reach	54.00 "
Fore arm, about	6.00 "

Another. Male; Port Townshend, December 18, 1856. No. 134.

From nose to occiput	7.25 inches.
From nose to base of tail	32.00 "
Tail vertebræ	8.00 "
Tail to end of hairy tip	8.50 "

The locality from whence this specimen was obtained shows that the range of the species extends on both sides of Puget Sound, and among the spurs of both the Cascade and Coast range of mountains.—S.

NOTE.—For several skins of this lynx, and for many other scientific as well as personal favors, I am indebted to my friend the popular and highly esteemed secretary of Washington Territory, his excellency the Hon. Charles H. Mason.

CANIS OCCIDENTALIS, var. GRISEO-ALBUS.

Gray Wolf.

BAIRD, Gen. Rep. Mammals, 1857, 104.

SP. CH.—Color of various shades, from gray to white. Some skins are much tinged with brown.

The Gray Wolf occurs on the Clatsop Plains, near the mouth of the Columbia, and also upon the Nisqually Plains, Puget Sound. It attains a very large size, and is too much for any single dog. It is called by the Chinooks Ileakhum, and is the Spilyer of the Yakimas.

A black wolf was seen by me in the mountains between Scott's and Shasta valleys, in northern California, in 1851. Several were together. A "black wolf," perhaps the same, perhaps the *C. nubilus*, or "dusky wolf," is found on the Nisqually Plains, Puget Sound. Some skins are grizzled.—G.

Owing to the variety in the shades and colors of the wolves of Oregon, the settlers at the Dalles, mistaking varieties for species or "kinds," consider that there are more species than the examination of many skins in the Smithsonian collection seems to justify.

There is considerable difference of opinion among the white inhabitants as to the number of

these species. Some make four species: two *large* or mountain wolves, and two *small* or coyotes. The mountain kinds are the black (probably *Canis nubilus*) and the red, (most likely the *Canis occidentalis*, which frequently is tinged with ferruginous.) Whether the "*black* wolves" are *black*, I consider doubtful. Settlers, however, have positively assured me that they have seen wolves "*perfectly black*." Frequently the black hairs on the back of the *Canis occidentalis*, seen from a distance, may, in certain reflections, cause the animal to have a general dark or black appearance. This would be the case with the wolf having such a skin as the one in my collection marked 47.

A few memoranda concerning this species, made in connexion with the skin last mentioned, (47,) may be found in my partial report, chap. 2, p. 90. They are exceedingly numerous in Oregon and Washington Territories, from the Cascades to the Rocky mountain divide, and probably extend much further north, east, and south. They are sparingly found west of the Cascades, occurring, according to Mr. Gibbs, on the Clatsop Plains, and have been obtained by me from the elevated plateau at the western base of the Cascade mountains, upon which Muckleshoot prairie is situated.—S.

CANIS OCCIDENTALIS, var. NUBILUS.

Dusky Wolf.

BAIRD, Gen. Rep. Mammals, 1857, 111.

[For synonymy and specific characters see work last quoted; also chap. 2, p. 90.]

The skin obtained by me of this species (or variety?) was from the Nisqually Plains. Formerly this wolf was quite abundant in that vicinity, much to the detriment of the sheep of the Puget Sound Agricultural Company, but, of late years, owing to the persuasive influence of strychnine, they, together with the wolf-like Indian dogs, have become quite scarce.—S.

CANIS LATRANS, Say.

Prairie Wolf; Coyote.

BAIRD, Gen. Rep. Mammals, 1857, 113.

Coyotes, apparently identical with the prairie wolf of the plains on the Platte river, I saw in great numbers in Scott's valley in 1851. I also shot one high up in the mountains of Eel river, in California, far from the coast; and in 1854 I again met with them in the Yakima valley, in Washington Territory, north of the Columbia and east of the Cascade mountains. The Chinooks call it Italipus, and believe it to be a sort of demon or deity.—G.

The *coyote* is common in central Oregon, where it subsists on small game, carrion, &c., but, on the vast desert plains of the interior, more especially upon the dead salmon washed up on the shores of the rivers and streams. At Fort Dalles they are very numerous. There, in 1854, an individual, apparently *rabid*, entered a stable and bit a horse in the nose. The horse was, in a short time, taken with every symptom of hydrophobia, and in a few days died. In 1853, during the small-pox epidemic among the tribes north of the Columbia, the natives, frightened, left their dead unburied. These were devoured by the coyotes, who shortly became afflicted with a terrible skin disease, in which the hair fell off, and the whole surface of the body became covered by scabs and putrid sores, which, irritated by the sun, wind, and sand, were a dreadful annoyance to the miserable brutes, who undoubtedly perished in great numbers.

The double voice of the coyote, by which one single individual can make noises as if several are barking or yelping at once, is a singular peculiarity, which is well known to mountain men.—S.

DOGS.

The dogs of the Indians on the Pacific coast differ greatly among themselves. Some common kinds are believed to be a cross of the coyote. On the Klamath is a dog of good size, with a *short tail*. This is not more than six or seven inches long, and is bushy, or rather *broad*, it being as wide as a man's hand. I was assured they were not cut, and I never noticed longer tails on the pups. They have the usual erect ears and sharp muzzle of Indian dogs, but are (what is unusual with Indian dogs) often *brindled gray*. Throughout Oregon the native dog is largely intermingled with imported dogs; but the Clallams, on Puget Sound, have a white dog, with very soft hair, which is sheared like the wool of sheep, and of which they make blankets. The fur or hair is at present generally intermixed with the ravellings of old English blankets to facilitate twisting with yarn. These are stretched over a frame and then interwoven, leaving a fringe (when finished) where the ends are separated.—G.

NOTE.—I sent to the Smithsonian one "dog's wool blanket," made of this material, and one of dog's wool and duck feathers mixed. All the Clallam dogs that I saw were *pure white*; but they have the sharp nose, pointed ear, and hang-dog, thievish appearance of other Indian dogs.—S.

The question of intermixture of the dog and coyote is, I suppose, an unsettled one; at least I do not know whether naturalists admit the perpetuation of the hybrid. It is, however, a matter of popular belief.

Lewis and Clark speak of the dogs as being remarkably small. They *are* much smaller than the Sioux dogs; ears erect and pointed like the wolf; hair short and smooth, except on the *tail*, where it is long and straight, like that of an ordinary cur; head long; nose pointed; eyes small; colors, parti-colored, black, white, brown, and brindle predominate, (I have noticed brindle principally in California.) None of the Oregon Indians eat their dogs; they use them for driving elk and deer.

I met one peculiar looking dog on Eel river, in the interior of northern California, among very wild Indians. It had *short* legs and long body, *like a turnspit*.—G.

The Indian dogs about the Dalles of the Columbia are so varied in appearance that no *special* description can be given. We might, however, make two types. The *large*, (yellow or brindled,) about the size of a foxhound, but much more slender, and the *small*, resembling the "*turnspit kind*," of which Mr. Gibbs speaks. The latter are generally white, or spotted liver and white, or black and white. This kind is kept more as a playmate for the children and a pet for the women. There are besides all sizes and colors, the result of crossing with each other and with imported animals.

The native dogs of Oregon subsist well upon fish, which they even do not hesitate to eat *raw*. Salmon, which is their common food, will make any blooded dog from the States very ill; scarcely one dog out of ten recovers. This "salmon sickness," as it is called, attacks the dog but *once*. It may, after all, be nothing more than the common dog *distemper*.—S.

VULPES MACROURUS, Baird.

Western Fox.

Vulpes macrourus, BAIRD, in Stansbury's Rep. June, 1852, 309.

IB., Gen. Rep. Mammals, 1857, 130.

[For synonymy and sp. ch. see chap. 2, p. 91.]

Foxes are very numerous near Fort Dalles, Oregon, and are apparently all of the long-tailed species. Good specimens are contained in my collection, marked 25, 33, 34. In examining a

collection of 25 skins of the red or common variety in the possession of a trader, I noticed that scarcely two could be found in which the tints and shades of color were precisely alike, although all conformed to one general plan of coloration, and were evidently of one and the same species.

Owing to the diversity produced by the three varieties—*red*, *cross*, and *silver*—with intermediate grades of all shades, there is much confusion among the settlers at the Dalles as to the number of *species* which exist. In all probability there is but *one*, varied in color, however, as above.

A very good typical specimen of this species (excepting its small size, it being a young male scarcely grown) is the one whose measurements are given in chapter 2, p. 91.

On the Columbia well dried, good skins can be readily purchased for 25 cents apiece, and in the way of trade are even bought by the storekeepers for much less. They are principally taken in traps or killed with strychnine.—S.

VULPES MACROURUS, VARS. DECUSSATUS AND CINEREO ARGENTATUS.

Silver Fox, Black Fox, and Cross Fox.

BAIRD, Gen. Rep. Mammals, 1857, 127 and 128.

The Hudson Bay Company's traders think that the different foxes hybridize largely, and that in this manner the diversity of fur found in the "cross" and "silver" varieties is produced.—G.

Specimens of both these varieties were obtained by me at Fort Dalles, Oregon. I say *varieties*, because I entertain no doubt upon the subject. Mr. Sinclair, who for many years had been engaged in the fur trade, and in 1855 residing at the Hudson Bay fort at Walla-Walla as officer in charge of the post, a man that I can vouch for as a reliable, intelligent gentleman, assured me that he has seen *in the same litter of young foxes individuals of the three varieties—red, cross, and silver-gray*.

The silver-gray variety is at times so dark as to give the fox an entire black appearance. Nathan Olney, esq., at the Dalles, told me that he had once seen one of these in that vicinity which was *completely black*, with the single exception of the snow-white tip to its tail, so common to all of the species.

On the other hand, the Wasco Indians say that the silver-gray is a *distinct* fox; that the *dog*, or *male*, is of the silver color, the *female* being *reddish*.—S.

VULPES (UROCYON) VIRGINIANUS.

Gray Fox; Kit Fox.

BAIRD, Gen. Rep. Mammals, 1857, 138.

[For Sp. Ch. see chap. 2, p. 91.]

A very handsome light-gray fox, smaller than the red fox, is common on the Klamath river, and occurs also in Oregon, as I have seen them from the Dalles. I shot one on Salmon river, California, which had been yelping for several nights in succession around my cabin. The fur of this species is not so fine as that of the silver-gray, but is very showy.—G.

The only skins of the gray fox which I obtained on the Columbia were those alluded to in my partial report in chapter 2, p. 91, of this volume. They were found among some rubbish in a closet at Fort Vancouver, and their history was wrapt in obscurity. They had probably been obtained from southern Oregon. The Des Chutes Indians told me that it is found in the Cascade

mountains of southern Oregon, and that it is called, in their language, (the Walla-Walla,) the *Loot-zah*.

An old trapper (M. Dofer) says that it is the "medicine wolf" of the Indians of the "Great Plains," who believe that its cry brings trouble and bad luck. It lives in burrows, like other foxes.—S.

BASSARIS ASTUTA, Licht.

Civet Cat; Raccoon Fox.

BAIRD, Gen. Rep. Mammals, 1857, 147.

The ring-tailed bassaris, often called raccoon fox, is common in California, where the people tame it. When domesticated it is said to kill rats and mice like a cat. I could get no distinct account of its habits from the natives, as I could only communicate with them with difficulty. In 1852 I found their skins quite common on the lower Klamath river, where they appeared to be considerably valued by the Indians, and are made into "breech-clouts," &c., by them.—G.

MUSTELA PENNANTII, Erxl.

Fisher; Black Cat.

[See chap. 2, p. 92.]

The skin of the fisher is much prized by the Klamaths for quivers. The length of the body of the full-grown animal is about two feet long; form slender; fur black and rather fine; claws much curved and white.

Lewis and Clark say that the black fox, or fisher, (an animal jet black, except a white spot on the breast,) "climbs trees after squirrels, raccoons," &c.—G.

Found in the Cascade and Blue mountains. The Indians who hunt in those ranges are fond of making quivers of the skins of this animal.—S.

PUTORIUS RICHARDSONII, Bonap.

Richardson's Weasel.

Futorius Richardsonii, Bp. in Rich. Zool. Beechey's Voyage, 1839, Mammalia, 10.—BAIRD, Gen. Rep. Mammals, 1857, 164.

[See chap. 3, p. 93.]

The specimen of Richardson's weasel, sent by me from Fort Steilacoom to the Smithsonian collection, and of which measurements are given in my partial report, (see chapter 2, page 93,) was obtained from Mr. Gibbs' farm, *Chet-lah*, near Fort S. It was killed among some logs and fallen trees on the 18th of August, 1854, and kindly sent to me by Mr. Gibbs. The animal had a pungent, acrid, musky odor, the result of either the emission of some secretion of the anal glands or from the discharge of urine during its death struggles. There is a slight typographical error in the measurements given on page 93. The girth behind the shoulders should read $3\frac{1}{4}$ inches instead of $3\frac{3}{4}$ inches. The chest, being readily compressible, would allow its passage through any hole which would admit the creature's head. This I believe is generally the case with all species of the genus.—S.

PUTORIUS LONGICAUDA, Bonap.

BAIRD, Gen. Rep. Mammals, 1857, 169.

[See chap. 2, p. 93.]

This weasel, mentioned by me in the partial report, (chapter 2, page 93,) was obtained in Nebraska, on the valley of Milk river. In the incomplete report above mentioned some

careful measurements in detail of this individual were omitted, which make my excuse for again introducing the animal, as I can throw no light upon its habits beyond that it was killed in a cotton-wood forest on the banks of the river.

Measurements of specimen.

Length from nose to base of tail	11.00 inches.
Caudal vertebræ	5.50 "
Tail to end of hairy tip	6.60 "
Girth around ears	4.60 "
Girth of thorax behind shoulders	4.00 "
Girth of loins	4.00 "
Length of forearm from end of olecranon	1.12 "
Length of femur	1.40 "
Length of tibia	1.25 "

S.

PUTORIUS VISON.

Common Mink.

[See chap. 2, p. 93.]

The mink is common throughout our northwestern Territories. They were obtained by me from the Rocky mountains, from the vicinity of Fort Boisé, in central Oregon, and from Puget Sound. I found them most abundant in the neighborhood of the latter, being common on both the shores of fresh water lakes and those of the salt sound itself. They are almost as aquatic in their habits as the otter and the muskrat. One which I shot near Fort Steilacoom was swimming in a fresh water lake, and at first was taken by me for one of the latter animals. On some of the islands of Puget's Sound, and upon those between Bellingham bay and Vancouver's island, they are very numerous, and are said in such localities to *subsist almost entirely upon shell-fish*.

Within a few years past the fur of minks has come extensively into fashionable use, and in consequence their skins have risen several hundred per cent. in value.—S.

LUTRA CALIFORNICA, Gray.

Californian Land Otter.

BAIRD, Gen. Rep. Mammals, 1857, 187.

The land otter is becoming more abundant in Oregon and Washington Territories since the decline of the fur trade. This animal is called by the Yakima Indians *nook-shi*.—G.

I obtained several land otter skins from the Puget Sound region, which were killed near White river, in the Cascade mountains. They are abundant on the streams of the Cascade mountains, and, as Mr. Gibbs observes, are increasing in numbers. My skins were, unfortunately, lost on their passage to Washington city.—S.

ENHYDRA MARINA, Fleming.

Sea Otter.

BAIRD, Gen. Rep. Mammals, 1857, 189.

The sea otter extends south along the coast of California to some distance at least below Cape Mendocino. They are abundant at Port Orford, Oregon, and a few are taken at the mouth of the Columbia.—G.

This animal, according to the officers of the Hudson Bay Company, are leaving the coast, being found now in much smaller numbers than formerly. They fancy that the majority have gone to the Japan and Russian coasts. The few now obtained by the company are generally from Fort Simpson, on the coast of Russian America, where it is still rather plentiful. They are found so abundantly near Cape Mendocino, and along the coast between that point and Port Orford, that several companies have been organized and equipped in San Francisco expressly for their capture. The average length of the skins of full grown individuals is about 6 feet. A very fine skin which I saw in the collection of furs in the Hudson Bay fort at Vancouver, Washington Territory, measured 74 inches in length. A test of the value and compactness of the fur is, that when blown upon strongly with the breath the hairs cannot be sufficiently separated to show the least portion of naked skin at the bottom. Skins of full length, and in prime condition, cannot be purchased at the Hudson Bay storehouse for less than \$100 apiece, and then only as a favor. They are in good demand in the Chinese markets, being considered among the wealthy celestials as affording the most luxurious and *récherché* attire.

Through the kindness of Dr. Glisan and Lieutenant Kautz, of the United States army, I obtained a sea otter skull from Port Orford, Oregon. Attached to the skull was a memorandum stating that it was that of a female two years old. This was sent to the Smithsonian collection, but I have not as yet heard from it.

The sea otter is called by the Nisqually Indians *Dah-hahht*.—S.

MEPHITES OCCIDENTALIS, Baird.

California Skunk; Western Skunk.

Mephites occidentalis, BAIRD, Gen. Rep. Mammals, 1857, 194.

[See chap. 2, p. 94.]

Skunks are plentiful throughout Washington Territory, Oregon, and northern California.—G.

The California skunk is extremely abundant throughout the western portions of Oregon and its sister Territory. At the Dalles of the Columbia they are so abundant as to be a pest to the settlers. Major Rains, of the United States army, assured me that during a two years' residence at Fort Dalles he killed 33 skunks, almost all of which had been living beneath the ground-floor of his house.

At Puget Sound they are also very numerous, living frequently under the houses of the settlers, and subsisting upon offal, carrion, dead fish, or any other edible substances which chance throws in their way. They are frequent attendants upon the heaps of fish tails, bones, fins, and other offal, at the Indian salmon fisheries. They are generally nocturnal in their habits, and at those times, especially when travelling long distances, prefer the beaten roads and trails.

The skunk is thought to be a *very brave* animal by the Sioux, Blackfoot, and other wild tribes east of the Rocky mountains, and the tail of the animal, or its skin, is considered a trophy or badge of distinction, only to be worn by the acknowledged "braves" of the tribe. I am not aware whether this custom prevails among the Indians of the Pacific coast, but presume not.

I have been called upon, professionally, to order treatment for men suffering from the sudden introduction of the peculiar stinking discharge of this animal into their eyes. It is violently irritating, temporarily causing intolerable smarting, photophobia, &c., the symptoms following its introduction being very similar to those caused by the application of tobacco juice to the same delicate organs. I have usually found that washing the eyes in simple cold water is the

best treatment, and that after a short space of time the unpleasant symptoms all disappear. Have heard that bathing the eyes in weak *vinegar* and water is also very efficacious. The skunk is said to cast its anal secretion upon its bushy tail, and that, with a dexterous jerk, it then throws it upon its pursuer. The settlers say that if a skunk is lifted up by the tail, he cannot, while thus suspended, throw the secretion upon his captor. This is an experiment which I confess I have not had the hardihood to make.

A large fat skunk, carefully prepared, I saw cooking in a camp on the Blue mountains of Oregon. The meat seemed so savory that I asked the gastronomic experimenter, who owned it, to give me a piece to taste. He did so, and I, finding the creature so much to my fancy, made a hearty dinner off of it. When carefully prepared, the anal glands and "scent bag" having been completely removed, they are certainly very good eating; the slightly strong flavor resembling much that artificially given by a skilful *chef de cuisine* with onions or garlic.

The settlers on the lower part of Puget Sound say that there are there two species of skunk; one of these, the larger kind, of which specimen marked No. 125, in my collection, is an example, is the *M. occidentalis*. The other is a small species not more than one-third the size of the first. [This is probably the *M. bicolor*, Gray.] It is a very pretty animal, not striped like the other, but of a black color, mottled or spotted on the back with white, as if with digit marks of white paint. This statement is made on the authority of several respectable citizens of the vicinity, who all unite as to the truth of the facts stated. Perhaps they may be in error by taking the young of the common kind for a second species. They say that the small skunk is not often found in winter, and that it is supposed that they hibernate. Also, that the small kind climb well, like rats, and do *not often cast their odor*. Mr. Madison, a settler at the Straits of Fuca, says that the habits of the two kinds are so different that he is *sure* that they are not identical.

The frequent residence of skunk, under the ground floors of the settlers' houses has already been alluded to. Living and breeding in these situations, they keep the atmosphere always slightly stimulating to the nostrils. *Mirabile dictu!* it seems that some people becoming accustomed to the scent rather acquire a fondness for it, upon the same principle, I suppose, that certain chemists become fond of the odor of sulphuretted hydrogen! The Nisqually Indians call the skunk *skum-meoh*, and have some very amusing traditions concerning it.—S.

TAXIDEA AMERICANA, Baird.

American Badger.

[See chap. 2, p. 94.]

The badger is very common on the dry, barren plains on the Yakima river, Washington Territory, also on the timberless mountains between the Yakima and the Columbia. I have never seen any badgers *west* of the Cascade mountains. It is called the by Yakimas *Weethla*.—G.

During my residence in Washington Territory I obtained but one skin of the badger, although the animal is, as Mr. Gibbs remarks, very plentiful in the open country east of the Cascade mountains. In certain sections, as, for instance, the Simcoe valley, their burrows are so numerous that it is exceedingly dangerous to ride fast lest your horse should, by stepping in one, fall, at great risk to both himself and the rider. This is also the case on the plains of the buffalo regions in western Minnesota (now Dacotah) and Nebraska. In the first mentioned Territory their burrows are inhabited in midsummer by vast numbers of a gregarious species of garter snake. I have seen at times, at the bottom of a vacated "hole," a dozen or more in a knot—the writhing excessively serpentine mass disgusting all but the naturalist.

Doctor Cooper, in his note, says that the badger has a strong "doggy" flavor, "not to mention its extraordinary toughness and leanness." The Doctor must have been unfortunate in his choice of a specimen to experiment upon. Those that I have seen are generally *too* fat, and one that I ate, in company with some Nez Percés Indians, on the southern slope of the Blue mountains of Oregon, I thought exceedingly good; so good that I allowed the savage banquet to replace my ordinary dinner.

The skin of the specimen obtained in Washington Territory was unfortunately lost on its way to the Smithsonian museum. As Professor Baird has examined skins from the west side of the Rocky mountains, and pronounced the species of both sides to be identical, I feel at liberty to give the range of the *T. Americana* in the northern sections of our country, as follows: Found sparingly in the eastern portion of Minnesota; becoming more abundant near the Missouri. From thence, after entering Nebraska, it extends almost all the way to the dividing ridge of the Cascade mountains, near the Pacific coast. Further west it does not go, at least *north* of the Columbia. I have seen it in the St. Mary's valley, at the western base of the main chain of Rocky mountains, and as far south in Oregon as the vicinity of Fort Boisé, on the Snake or Lewis river. They are most abundant (north of Utah) in the vicinity of Powder river, Oregon, and the Yakima, one of the northern tributaries of the Columbia. The specimen obtained in Minnesota was so fat that I had much difficulty in skinning it properly for preservation.—S.

PROCYON HERNANDEZII, Wagler.

Black-footed Raccoon.

Procyon hernandezii, WAGLER, Isis, XXIV, 1831, 514.—BAIRD, Gen. Rep. Mammals, 1857, 212.

[See chap. 2, p. 94.]

How far east the black-footed raccoon extends is still a matter of some doubt. In 1855 Mr. Sinclair, a gentleman then in charge of the Hudson Bay fort at Walla-Walla, informed me that the "raccoon" does not extend north of the 50th parallel. But as Mr. Sinclair had spent the greater part of his life in the Saskatchewan and Red river regions, it is probable that his remark applied only to the *P. lotor*, the common species east of the Rocky mountains. The *P. hernandezii* is found quite abundant on Puget Sound, as far as 48° north, and probably extends along the coast to a point at least as high as the 55th parallel. This opinion the mildness of the winters of that section of the northwest coast seems to justify.

I obtained many specimens of this species while at Fort Steilacoom. They are quite abundant in that vicinity, having much the same habits as the common raccoon of the Atlantic States; taking to trees when pursued too closely by dogs; feeding and moving about occasionally in the day, but most frequently at night; frequenting the borders of ponds at night, in pursuit of frogs, dead fish, &c.; more or less gregarious in their character, and when wounded, or at night while engaged in combats or courtships, filling the air with their noisy, snarling, cat-like screams. In these and in all other habits they resemble "that same old coon" at home.

Mr. Sinclair, whose long experience in the fur trade entitles his statements to respect, gave me some interesting statistics concerning the valuable part that the fur of the raccoon takes in that lucrative business. He stated that several years ago, at one of the great regular semi-annual fur sales at London, over 730,000 raccoon skins were sold, of which the majority were

from the different private American traders and companies, only 2,000 being annually collected by the Hudson Bay Company. At the great sale mentioned they brought from 11 pence to 2 guineas each, and were collected during the previous year. They were principally in demand for the Germans and Prussians, who use them for caps, &c., &c.

The raccoon is the *bellopes* of the Nisqually Indians, and by them is considered the *second* species of *wild-cat* which inhabits their country!

A fine male *P. hernandezii* was obtained by me at Fort Steilacoom October 21, 1856. It measured as follows:

? Nose to base of tail.....	32.00 inches.
Vertebrae of tail.....	11.50 "
Tail to the tip of hair.....	13.25 "
Easy girth behind shoulders.....	13.25 "

S.

URSUS HORRIBILIS, Ord.

Grizzly Bear.

Ursus horribilis, ORD, Guthrie's Geography, 2d Am. Ed. II, 1815, 291, 299.

SAY, in Long's Expd. II, 1823, 53.

Ursus ferox, ("LEWIS & CLARK,") RICHARDSON, F. B. A. I, 1829, 24; pl. i.

AUD. & BACH, N. A. Quad. III, 1853, 141; pl. cxxxi.

White bear, BARTON, Phila. Med. and Phys. Jour. I, 1805, 75.

Grizzly, gray, white, and brown bear, LEWIS & CLARK, *passim*.

SP. CH.—Size very large. Tail shorter than ears. Hair coarse, darkest near the base, with light tips. An erect mane between the shoulders. Feet very large; fore claws twice as long as the hinder ones. A dark dorsal stripe from occiput to tail, and another lateral one on each side along the flanks, obscured and nearly concealed by the light tips; intervals between the stripes lighter. All the hairs on the body brownish-yellow or hoary at tips. Region around the ears dusky; legs nearly black. Muzzle pale, without a darker dorsal stripe.

BEARS.

White or Grizzly; Yellow Bear; Brown or Cinnamon.

There is a great diversity of opinion whether these are the same bears under a different condition of peltry, age, &c., or not. It is certain that the young of the *grizzly* do not necessarily differ in color from the old, as I have seen gray or white *cubs* as well as old bears, and the two varieties inhabit the same districts of country. Lewis and Clark suppose them to be the same, and mention a peculiarity that I never thought of noticing, *i. e.*, their bearing the testicles in separate bags, from two to four inches apart, pendant from the belly, and further forward than those of the black bear. Both are abundant throughout California. I saw great numbers in 1851 upon the true Coast range of that State, or the one lying between Russian and Eel rivers and the Pacific. They are abundant, also, upon the "Bald Hills," between Humboldt bay and the Klamath, and on the mountains between the Klamath and Trinity rivers; in fact, almost everywhere that the oaks and manzanita (shrubby *arbutus*) furnish acorns and berries. Of the berries of this manzanita, which resemble, in size and character, those of the *arbutus uva ursi*, they are very fond. They also dig up the nest of the "yellow jacket wasp," which abounds in the mountains. More to the northward they become scarce near the coast. I have never heard of them on the Coast range between the Willamette and the sea. Neither are they found to the north of the Columbia, though the Chinooks have a separate name for them,

(*esiamb*,) and say that they have seen them. I do not think they exist in the Olympic range, as the skins I have seen on Puget Sound are all of the *black* bear. On the eastern slope of the Cascades north of the Columbia they are found, though but rarely.

The *grizzly bear* of California has been known to attain the weight of 1,600 pounds, and, it is said, even of 2,000, a size almost incredible. The white grizzly seems to bear the same relation to the cinnamon that our black does to the brown bear of Europe. I consider them myself as different, but they, perhaps, hybridize, which gives rise to the intermediate shades of color. The hunters have some very curious notions concerning bears generally. They say that no one has ever found a female with young in her, no matter at what season they have killed them, even when hybernating. Another is, that when the bear goes into winter quarters he contrives to stop his fundament with clay, which remains there during the whole winter, nothing passing him while asleep. In the spring the clay comes out, being first softened by a black liquid which oozes from the animal! Both these stories are evidently common hunters' opinions, having been told me by persons who have never had communication with each other.

NOTE.—Mr. Gibbs, since writing the foregoing, has communicated, in a letter to Dr. Suckley, the following additional information concerning the geographical range of the large bear.

“The *brown bear* is found in the Olympic range, and grows as *big as a cow*! So says Mc. N——, who brought me a fine *black bear* skin the other day, and has promised me a *brown* one. He says that the hair of the last mentioned is coarser and shorter than that of the black species.”

An absurd idea, similar to the story about the bear's habit of closing his anus with a “ball of clay,” prevails among the Indians at the Dalles, with the variation, however, that the ball is composed of hard pine resin!

Excepting what Mr. Gibbs states of the probable occurrence of the grizzly or the large brown bear in the Coast range, I have never received any intimation of its existence in the western part of Washington Territory; but in the Rocky mountain portion it is rather common. They are very abundant in northern Nebraska along the Missouri river; and I was told, by the half-breed hunters and guides of our exploring party, that they are found as far east as the Devil's lake, (or Miniwakan,) a large salt lake in the northwestern part of Minnesota. In California they are very abundant, and, in San Francisco, at the menagerie, I have seen nearly a dozen at a time. They were quite tame; even the largest performed various amusing tricks with the readiness and intelligence of a New Foundland dog.—S.

URSUS AMERICANUS, Pallas.

Black Bear.

BAIRD, Gen. Rep. Mammals, 1857, 225.

The common black bear is quite abundant throughout the wooded portions of Oregon and Washington Territories. In the latter they are especially abundant in the timbered districts near the coast. I obtained at Fort Steilacoom several fine skins of adults, and one very perfect skin of a cub, which was presented me by my kind friend Dr. J. B. Webber. Their habits seem indetical with those of their brethren east of the Rocky mountains.

In the Chinook jargon this animal is called *itshoot*.

SCIURUS FOSSOR, Peale.

Western Gray Squirrel.

Sciurus fossor, PEALE, Mamm. and Birds, U. S. Ex. Ex., 1848, 55.

BAIRD, Gen. Rep. Mammals, 1857, 264.

[For description and measurements see Suckley's partial Report, chapter 2, p. 95.]

Immense numbers of the California gray squirrel exist on the Klamath river. They frequent oak groves, and the neighborhood of the bay-leaved juglans.—G.

Concerning this species I have nothing to add to what is written on page 95. It has apparently not crossed the Cascade mountains to the west, in Oregon, and it is a matter of some doubt whether the species is found at all in Washington Territory.—S.

NOTE.—Mr. Gibbs, in a letter to me, says that he has seen in a cage, tamed, a *gray tree squirrel*, not the *S. fossor*, but smaller, which had been brought from California. He saw another dead, lying on the ground in the Willamette valley.—S.

In 1853, when descending the Flathead river, a tributary of Clark's Fork of the Columbia, which meanders through the Bitter Root chain of Rocky mountains, I saw from my canoe a black squirrel ascending a tree on the bank. From some cause or another I did not obtain the specimen, and was reluctantly obliged to move on, consoling myself with the hope that I should ere long fall in with another. But in this I was disappointed. The squirrel was much of the same size and general appearance as the common black squirrel of the Atlantic States.—S.

SCIURUS RICHARDSONII, Bach.

Richardson's Squirrel.

[For Sp. Ch. and synonymy see chap. 2, p. 96.]

The Richardson's squirrel holds the same place in the Rocky mountains that the Douglass squirrel does in the Cascades. In common with the last mentioned species, they have many similarities and habits, showing a marked affinity with the red squirrel.

This species subsists principally on the seeds of the red pine of the Rocky mountains, ? *Pinus ponderosa*.—S.

SCIURUS DOUGLASSII, Bach.

Oregon Red Squirrel; Pine Squirrel.

[For Sp. Ch., &c., see chap. 2, p. 97, or Baird's Gen. Rep., Mammals, 1857, p. 275.]

The western pine squirrel is found on both sides of the Cascade mountains. It feeds indifferently on the seeds of the pine, fir, and arbor-vitæ.—G.

The Douglass pine squirrel, in the western part of Washington Territory, takes the same position that the red squirrel does in the Atlantic States, having much the same size, habits, and (excepting color) general appearance. When disturbed by the too close approach of man it manifests displeasure much like the red squirrel, by chattering, "scolding," &c. It remains active throughout the winter, and is a very abundant resident.

A fine male specimen of this species, killed at Fort Steilacoom, June 17, 1856, measured as follows:

No. 99. Nose to occiput.....	2.00 inches.
Nose to base of tail.....	7.50 "
Tail vertebræ	4.50 "
Tail to end of hairy tip	6.00 "
Hand to end of longest nail.....	1.36 "

?PTEROMYS OREGONENSIS, Bach.

Oregon Flying Squirrel.

BAIRD, Gen. Rep., Mammals, 1857, p. 290; also chap. 1, p. 80.

I have heard of several flying squirrels that have been found in the Puget Sound region. One was kept alive for some time as a pet in a family residing on the Nisqually river.

Mr. Packwood, one of the oldest and most reliable settlers on Puget Sound, informed me that the animal there found is much larger than that of the Atlantic States; approaching much more the size of an ordinary gray squirrel.—S.

TAMIAS TOWNSENDII, Bach.

Townsend's Striped Squirrel; Western Chipmonk.

[For Sp. Ch. and synonymy see chap. 2, p. 97, or Baird's Gen. Rep., Mam., 1857, p. 300.]

This squirrel is exceedingly abundant in the Cascade mountains and in the forest regions of Puget Sound and the lower Columbia. In habits it closely resembles its near relative the *T. quadrivittatus*, as well as the common "chipmonk" of the Atlantic. Like these species, it probably spends the cold season in torpor.—S.

NOTE.—*T. quadrivittatus*, Say, chap. 2, p. 97. This species is to be looked for on the eastern slopes of the Cascade mountains in Washington Territory, as it occurs near Klamath lake, and in the Blue mountains of Oregon. Dr. Cooper thinks that the differences noticed on page 81, chap. 1, in their cries, may indicate that those seen by him near the Yakima river were, in part at least, of this species.

SPERMOPHILUS BEECHEYI, Rich.

California Ground Squirrel.

BAIRD, Gen. Rep., Mammals, 1857, 307; also chap. 1, p. 81.

I saw the California ground squirrel in the valley of Clear Lake—a large sheet of water between Russian river and the Sacramento—and afterwards I saw them in immense numbers on the Salmon, a branch of Klamath river. They inhabit the "foot-hills" which extend down to the terraces, or, as they are called, "high bars," on the river, which are everywhere marked by their trails leading to water, which are beaten as plainly as those of deer. They are in body about the size of the grey squirrel, but shorter, their fore legs being *very* short.—General color *mottled gray*, with a *black* patch, or broad stripe, between the shoulders.

They are inveterate thieves, impudently entering the huts and tents of the miners to steal flour, bread, rice, &c. I have had large cakes of baked bread carried, or more probably *rolled*, by them from one end of my cabin to the other. To make amends, they are delicious eating; the flesh, very white and tender, resembles more nearly frog's legs than any thing else to which I can compare it. In autumn they are fat enough to fry in their own grease. I have heard that they extend as far north as the Willamette valley, but I never saw them there myself. Their tails, like those of the white-footed rat, (*Neotoma occidentalis*), are sparsely covered with hair.—G.

SPERMOPHILUS DOUGLASSII, Cuvier.

Columbia Ground Squirrel.

[See chap. 2, p. 98.]

The Columbia "ground squirrel" is found very numerous on the open plains and the scrub oak foot-hills, at the eastern bases of the Cascade mountains. Near Fort Dalles they are very

abundant, and animals apparently identical are quite common in the Blue mountains of Oregon. No individuals of this species were observed by either Dr. Cooper or myself north of the Columbia. They hibernate during winter and are not seen until about the 1st of April, when they make their appearance on fine days. At first they are apparently feeble and still very sluggish in their movements, so that if they venture a short distance from the mouths of their burrows they are readily killed with sticks or stones. Later in the season they are quite active, and very rat-like in their movements and habits, which, however, are principally diurnal. In summer they are quite fat, and are said to be very good eating when cooked. Their burrows are entered by small round holes, which are but little larger around than the bodies of the full grown animals.

They do not burrow, like prairie dogs, in villages, at least they are not *markedly* gregarious, but seem to be governed in their choice of localities by the abundance of food. From their marked preference for oak groves I should judge that acorns form a considerable part of their sustenance.—S.

CYNOMYS LUDOVICIANUS, Baird.

Prairie Dog.

[See chap. 2, p. 99.]

In 1849 the mountaineers told me that this animal is confined to the vicinity of the waters which flow into the Missouri, and that upon crossing the water-shed and entering Oregon they are replaced by a "large squirrel," living in the rocks, which resembles the "dog," but does not "bark." The Indians, they say, make robes of its skin. Probably this latter is the Douglass spermophili which exists in great numbers on the Columbia, east of the Cascades.—G.

In crossing the continent by land, in 1853, our party found "prairie dogs" in great numbers all along its route through Nebraska, following the line of the Upper Missouri and its tributaries. They occurred in the Rocky mountains themselves, on the Dearborn river, and far up the Blackfoot Pass, on the eastern slope of these mountains, to a point not far from the "divide." They may cross and extend a *short* distance in Washington Territory, but I think that the western slope of the mountains is too heavily timbered for them.

Townsend speaks of their being found in Oregon, but this active and really praiseworthy naturalist allowed his specimens and notes to become so "mixed up," that at last, finding so many of his statements erroneous, naturalists sometimes doubt his testimony, unless further backed up by that of others. I have inquired of many old settlers and others, reliable men, none of whom corroborate Dr. Townsend's statement. In Nebraska their "towns" are situated, in many instances, long distances from water, in places where it frequently does not rain for six or eight months at a time, and where dew scarcely falls. It is for this reason supposed that they burrow sufficiently deep to reach water. One kept alive by me rapidly became tame.

Measurements of three specimens obtained on Milk river, Nebraska Territory.

	A.	B.	C.
Length from nose to base of tail (in inches).....	11.50	11.00	10.75
Tail, to hairy tip.....	4.50	3.75	3.00
From occip. protuberance to tip of nose.....	2.75	-----	-----
Girth behind shoulders.....	7.75	-----	-----
Girth around loins.....	12.25	-----	-----
Girth around head, over the ears.....	5.33	-----	-----
Length of forearm.....	1.75	-----	-----
Tail vertebrae.....	-----	3.00	2.25

Eyes black.—S.

NOTE.—Lewis and Clark speak so positively of the occurrence of a “barking squirrel” in the plains of the Columbia, that we cannot entirely pass their statement by without notice. According to Mr. Ord in Guthrie’s Geography—“These animals form in large companies like those on the Missouri, occupying with their burrows sometimes two hundred acres of land; the burrows are separate, and each possesses, perhaps, ten or twelve of these inhabitants.”

Perhaps the species mentioned by them may have been, as Professor Baird suggests, the *C. gunnisonii*, or it may have been the *C. ludovicianus*. If the latter, why did it not “bark,” like those on the Upper Missouri?

I have made several inquiries of individuals well acquainted with the interior of Oregon, but have never met with any who have seen the animal, and I have not heard mention of the “dog towns” spoken of by Lewis and Clark. Neither have I seen any indication of the existence of the species during my own journey over nearly the same route as that pursued by those travellers.

May not these animals have formerly existed until some disease having occurred they became exterminated? Such an epidemic, according to Mr. Gibbs, broke out among the prairie hares at Walla-Walla, nearly destroying the species in that vicinity.—S.

ARCTOMYS FLAVIVENTER, Bach.

Yellow-footed Marmot, Western Woodchuck.

BAIRD, Gen. Rep., Mammals, 1857, 343.

In May, 1855, I obtained at Fort Dalles a couple of specimens of the yellow-footed marmot. One was an old female, the other a young individual about two-thirds grown. They were brought to me alive by an Indian, who stated that he had caught them among the basaltic rocks on the Washington Territory side of the Columbia, opposite Fort Dalles, and that in that immediate vicinity they are not found on the *south* side of the river.

From the appearance of the young individual I should judge that it had been littered about the middle of February. I kept them alive for some days in a barrel. They were exceedingly wild, and apparently untameably savage. Snarling and snapping whenever the lid of their barrel was removed, at the same time uttering a very sharp shrill cry, which Mr. Nuttall would have probably described as like *chek, chek*. The skin of the female is now preserved in the Smithsonian collection; it is much worn, many of the hairs having fallen out, as if she was then changing her coat.—S.

While in the vicinity of the Straits of Juan du Fuca in 1855 I bought a quantity of skins which appear to belong to an animal the western representative of the woodchuck of the Atlantic. All the skins bought want heads and tails, having been sewed into robes. The fur, thick and soft, is of a silvery gray on the back. Tail and belly reddish brown. Tail about five or six inches long; its hair quite coarse.—G.

APLODONTIA LEPORINA, Rich.

Sewellel; the Show’tl of the Nisqually Indians.

BAIRD, Gen. Rep., Mammals, 1857, 353.

SR. CH. —Size that of *Fiber zibethicus*. Tail very short, color reddish brown. Male, length to base of tale, about 13 inches. Tail vertebrae, 1.50. Penis osseous—knobbed at the extremity and obscurely bifurcated. Testes concealed, no scrotum apparent externally. Female slightly smaller. Half-grown young of a brownish lead color.

I noticed the burrows of the show’tl in 1853, at the top of the main Yakima Pass, in the Cascade mountains, at an elevation of 3,500 feet, and again in 1854, at the Nahchess Pass in

the same mountains. The Indians trap them, and value their flesh highly as food. The Yakima Indians call it *Squallah*. Its range in the Territory is quite extensive, from high mountain elevations to near the salt water.

Colonel Simmons, one of the earliest settlers in Washington Territory, confirms the statement of the Indians that the show'tl, like the prairie dog, lives in companies. He has frequently seen them sitting at the entrances of their burrows early in the morning, and whistling something in the manner of the prairie dog.

Lewis and Clark say that this animal "mounts a tree and burrows like a squirrel." The statement that it "mounts a tree" is probably an error.—G.

In 1856 I obtained at Fort Steilacoom four specimens of the show'tl, of which three were adults. The other half-grown individual was caught June 25. It is probable that the *Aplodontia*, like many other rodents, has several litters of young during the season.

The Nisqually Indians, in their mythological traditions and obscure stories concerning the creation, say that the show'tl was the *first animal created with life*. I cannot find out whether they undergo a regular torpid hybernation. The natives say that they move about a little during the winter, but *do not become decidedly active until late in the spring*. They live in burrows, in small companies of a dozen or more, and subsist on roots, berries, &c. The Indians say that the show'tl of the Cowlitz river has a *white* breast and belly. Those at Nisqually, having the under parts dark, are said to retain the same coloration throughout the year, of which the specimens bearing the private marks 92, 93, and 94 are good examples.

They are considered by the Indians to possess high gastronomic excellencies. To ascertain this I had one roasted *secundum artem*. I found it excellent; tasting much like chicken, or perhaps more like a well roasted sandhill crane; far superior to woodchuck, neotoma, raccoon, or beaver—"de gustibus non est disputandum."

Measurements of specimens.

	No. 92, male.	No. 93, male.	No. 94, female.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
From tip of nose to base of tail.....	12.75	13.00	12.25
Vertebrae of tail.....	1.50	1.50	1.50
From base of tail to tip of hair.....	2.37	2.25	2.25
From occipital protuberance to tip of nose.....	3.00	Nearly 3.00	Nearly 3.75
Distance between ears.....	2.75	-----	-----
Height of ears posteriorly, about.....	.75	-----	.75
Easy girth of head, measured around the ears.....	7.36	-----	-----
Olecranon to wrist.....	2.50	-----	2.25
Middle nail of fore paw, about.....	.50	-----	-----
From wrist to end of longest nail.....	1.60	-----	1.87
Easy girth behind shoulders.....	7.12	-----	7.75
Extent from most projecting toe nail of hind foot to ditto of fore foot, extreme stretch.....	18.00	17.75	18.00
From heel to end of middle toe nail.....	2.12	-----	2.25
Longest whiskers, about.....	-----	-----	3.00

Hind feet of all the specimens very destitute of hair; fore feet more hairy. Tongue fleshy. Eyes small, (about .36 of an inch in diameter.) Cheeks and lips very thick and fleshy. Teeth

yellow. Males: Penis osseous, obscurely bifurcated, knobbed; testes concealed; no external scrotum.

They prefer to make their burrows in the rich ground near springs, perhaps partly influenced in choice of this selection by proximity to certain kinds of food. Before blankets and civilized clothing had become extensively used by the Indians of the northwest, many were in the habit of making robes and garments of the skins of these animals, by stitching them together.

Habitat.—Washington Territory, from the eastern bases of the Cascade mountains west to the ocean. ? Northern Oregon.

Three specimens sent by me to Washington are now in the Smithsonian collection. Several others, which I had preserved in alcohol for dissection, &c., were subsequently lost on their passage to the above named city.—S.

NOTE.—Mr. Gibbs writes: "I find the Lewis and Clark's name of Sewellel for *A. leporina* is an error. The Chinook name for the animal itself is *o-gwool-lal*. *She-wal-lal* (Sewellel, corrupt) is their name for the robe made of its skins."

CASTOR CANADENSIS, Kuhl.

Beaver

BAIRD. Gen. Rep., Mammals. 1857, 355.

The beaver and the land otter, particularly the former, have multiplied rapidly since the fur trade has become of such little value. I am told that they are now in greater numbers than they have been at any time since the first flush of the trade. The natives no longer seek them, as they get clothing from the whites, and also because the skins bring such small returns, a dollar being the present price of a large beaver skin in the stores. The Hudson Bay Company give much less for them in trade.—G.

I sent several hunters' skins of the beaver, which I had obtained in Washington Territory, to the Smithsonian museum. Beavers are very common on the small streams in the Cascade mountains, and, as Mr. Gibbs says, are apparently increasing. I saw a "beaver dam" at the outlet of a small pond near Cedar river, W. T., which in all essential particulars resembled those I saw of the same animal in the Rocky mountains.—S.

THOMOMYS DOUGLASII, Giebel.

Columbia Gopher; Pouched Rat.

[For extended synonymy and Sp. Ch., see chap. 2, p. 100.]

The pouched rat is very abundant on the Nisqually plains. It is very destructive to potatoes, while in the ground, carrying off large quantities of the smaller ones and cutting the vines.—G.

The natives at Fort Steilacoom (Nisquallys) call the gopher *mes-ka-dah*, or the thief. These animals are very abundant on the gravelly prairies near Nisqually. They prefer the richer and less gravelly portions in the hollows and swales, as well as spots along the edges of the prairie brooks where the soil is good. In fact, the settlers look upon the presence of their peculiar mounds or hillocks as a sure indication of rich soil. These mounds are about three inches in height at their summits, and from nine to fifteen inches in diameter—rarely, however, exceeded ten or twelve. Although, on account of their tendency to "cave in," they are somewhat dangerous for horses to travel over, they, nevertheless, are not near so dangerous as similar heaps thrown up by the gophers of Minnesota, which will rarely stand the pressure of a horse's foot, as they are larger, and their cavities greater than those of the present species. In Minnesota these "gopher hills" are extremely common on the buffalo

hunting grounds, where the hunters frequently suffer severe injuries from their horses falling after treading on one while at full speed.

At Fort Dalles the Columbia gopher is also quite abundant. I obtained many specimens during the spring of the year, which had been turned up in ploughing.—S.

DIPODOMYS PHILLIPPI, Gray.

Kangaroo Rat.

BAIRD.—Gen. Rep., Mammals, p. 412.

The kangaroo rat is quite common on Salmon river, a branch of the Klamath.

While crossing the "Plains" in 1849 I killed, near the Platte river, a small animal belonging to the rat family, resembling the *jerboa* in the length of its hind legs.—G.

Dr. Cooper thinks that this was probably the *D. ordii*, which is very common at Fort Laramie, on the Platte, where he obtained several specimens in 1857.

The only specimen of this *Dipodomys* which I obtained in Oregon is the one mentioned in my partial report, chapter 2 of this volume. It is called *sim-tup-tup* by the Walla-Wallas, and is said by them to be abundant in the berry patches on the slopes and foot-hills of the Blue mountains of Oregon.—S.

JACULUS HUDSONIUS, Baird.

Jumping Mouse.

[See chap. 2, p. 101.]

The jumping mouse is very abundant in the vicinity of Puget Sound. I obtained several specimens in our camp on Muckleshoot prairie, about 20 miles from the sound. A temporary flooring of boards having been laid in our tents it was not long before these little creatures availed themselves of the advantages thus furnished for a comfortable residence. In habits, food, &c., they much resemble the small field mice and their relatives.—S.

HESPEROMYS GAMBELII, Baird.

Gambel's Mouse.

[See chap. 2, p. 102.]

Gambel's mouse was obtained by me at Fort Dalles, O. T., where it is considered a great pest, both by whites and Indians, on account of its passion for cutting and gnawing holes in blankets, shawls, clothing, and all sorts of woolen fabrics. It is almost impossible to secure such articles from the attacks of these little animals. The individual obtained by me, whose skin is now carefully preserved in the Smithsonian collection, gained his present obituary and scientific distinction by gnawing an enormous hole in the middle of a new uniform coat belonging to a brother officer, having surreptitiously gained access to a chest of drawers supposed to have been mouse-proof.—S.

HESPEROMYS AUSTERUS, Baird.

White-bellied Mouse.

BAIRD.—Gen. Rep., Mammals, 466.

The white-bellied mouse is met with at a very high elevation in the Cascade mountains, as well as upon the Nisqually plains, which are not more than 200 feet above the level of the sea.—G.

Quite abundant near Fort Steilacoom, but seemingly not so fond of cutting blankets, cloth clothes, flannels, and other woolen fabrics, as the preceding species.—S.

NEOTOMA OCCIDENTALIS, Cooper.

Bushy or Hairy Tailed Rat; Oregon Wood Rat; White-footed Rat.

[See chap. 2, p. 102.]

The Hairy-tailed or White-footed rat is a very large species; the tail thickly covered with hair; feet and belly white; fur dark and pretty fine; legs very short in proportion to the size of the body.—G.

When I was first at Astoria, in 1849 and 1850, they were very abundant and troublesome, carrying off immense quantities of things, transporting quarts of rice, coffee, &c., which they stored in boots and other articles hung up in the shops and warehouses. Lately they have become more scarce, having been driven off, I presume, by the ship rat. (*Mus decumanus*.)

It is, I think, like the other species of its genus, properly a *wood* rat. Lewis and Clark say that the rats which inhabit the Rocky mountains, like those on the borders of the Missouri, (the *N. cinerea*,) have "the tail covered with hair." They do not mention the white feet and large size of the Oregon neotoma, but evidently confound it with the wood rat, now so rare in the Atlantic States, of which I caught a specimen many years ago in Massachusetts.—G.

This neotoma is common in Washington Territory west of the Cascade mountains. A few years ago it was a frequent inhabitant of the houses of the settlers, and still is in such places, as the *Mus decumanus*, or the common brown rat, has not as yet reached. Upon the arrival of this latter, the much more harmless neotoma, although fully as large and stout as his adversary, soon vacates the premises, either betaking himself to his native wilderness, the forest, or to that "bourne from whence no traveller returns." In regard to the habits of this creature much of interest is related by the settlers. All confirm the accounts given by Mr. Gibbs and Dr. Cooper of their thievish practices.

I obtained a very fine male specimen at New Dungeness, on the Straits of Juan de Fuca. It was killed by Mr. Madison, a settler in that locality, who gave me the following account of their habits, which he has had many opportunities of observing: He says that when irritated or alarmed they have a habit of stamping with their hind feet like rabbits. When sitting at rest, or while feeding, they assume the peculiar sitting posture of the squirrel, but differ in the manner of carrying the tail, not curling it like the latter animal, but carrying it *straight and up*. They make nests or beds of soft materials, which are frequently as large as a half bushel measure. The rat *does not burrow* into this, but *lies in a depression on the top*—the whole fabric resembling a bird's nest. In dwelling houses this nest is composed of all sorts of material, embracing feathers, cotton, bits of calico, fragments of blanket, strips of cloth, shavings, and anything else that is light and soft. It is a great thief, magpie-like, stealing articles of which it can make no possible use. Mr. M. says that he has known one of these rats carry to its magazine in the course of a single night two bushels of unshelled peas, from a point 100 yards distant. He thinks that these stores are intended for winter consumption—in my opinion a very just conclusion.

My friend, E. D. Warbass, esq., of Bellingham bay, informs me that he has frequently found their "caches" of stolen articles—a very heterogenous mixture of bits of leather, buttons, nails, rice, coffee, half dollars, &c.

These "caches" are capriciously selected. At the cascades of the Columbia I was told by a storekeeper that boots, empty kettles, &c., would be chosen, and that he had found in a boot a pint of rice, together with other things which had been brought together, grain by grain, and bit by bit, by these industrious animals. Like other rats, it is principally nocturnal in its habits.

Before the advent of the brown rat skunks were their principal enemies, who still, where they exist, hunt them indefatigably, under and in the houses and outbuildings of the settlers. I was told that the specimen I obtained, of which the measurements are given below, was not so large as are sometimes seen. From the appearance of the teeth, &c., of my specimen, I judge that it was a full-grown adult.

Measurements of specimen 149, male, killed at New Dungeness, W. T., Straits of Fuca, Jan., 21, 1857.

From nose to occiput	2.38 inches.
From nose to base of tail	9.75 do.
Tail vertebræ	7.12 do.
Tail to end of hairy tip	8.38 do.
Height of ear posteriorly (from plane of occiput)	1.30 do.
Hind foot, heel to end of longest claw	1.75 do.
Fore foot, heel to end of longest claw	1.12 do.

All the feet, belly, under surface of tail, and inside of legs *white*. Top of head plumbeous, brownish gray. Sides of back brownish gray; middle of back darker. Upper surface of tail plumbeous. White hairs of the flanks plumbeous at their bases; those of the middle of the breast white to their bases, but tinged with yellow on the surface, especially a spot about the size of half a dollar around the umbilicus, which is quite of a soiled yellow appearance. The settlers say this spot is persistent, being found on all specimens.—S.

ARVICOLA TOWNSENDII, Bachman.

Oregon Ground Mouse; Oregon Salt Meadow Mouse.

[See Baird, Gen. Rep. p. 527.]

Townsend's meadow mouse, also called the salt-marsh rat, is found on the tide prairies and salt meadows bordering Puget Sound. It is very common on the salt meadows along the Straits of Fuca, where, at New Dungeness, I obtained a specimen. On the potatoe fields on the rich "bottom lands" in the neighborhood of these marshes they are quite destructive to that vegetable. The marshes are very much "cut up" by narrow little trails and paths which they travel upon. These are about 2 inches wide and well beaten, looking much like buffalo trails in miniature. These mice are very numerous at Dungeness, so much so that Mr. Madison informs me that he has killed several hundred in a day while ploughing.

Measurements of specimen 150, obtained by me at New Dungeness January 27, 1857; male.

From nose to occiput, about	1.50 inches.
From nose to base of tail	5.87 do.
From base of tail to end of vertebræ	2.56 do.
From base of tail to end of hairy tip	2.68 do.

Extreme span of hind and fore feet.....	8.50 inches.
From heel to end of most projecting toe-nail	1.12 do.
From wrist to end of most projecting toe-nail.....	.56 do.

Ears hidden by the long fur of the head; they are quite large and nearly naked; whiskers very short; eyes small; teeth yellow.

NOTE.—The note published in my partial report, chapter 2, of part 2, this volume, was inserted by mistake; it was intended to apply to the other species of field and meadow mice.—S.

FIBER ZIBETHICUS, Cuv.

Muskrat.

BAIRD, Gen. Rep Mammals, 1857, 561.

I have obtained several specimens of the common muskrat from the lakes and fresh waters near Fort Steilacoom, Puget Sound. Two skins of these were sent to Washington, and are now in the collection of the Smithsonian Institution. I have seen some of their stack-like houses on lakes near Fort S. The Indians of the interior carry many muskrat skins to the Hudson Bay trading establishments, where they obtain one charge of powder and ball for each. They take the animal in traps, ammunition being too valuable to expend for them.

Indian women on the Cowlitz river use the skin of a muskrat in childbed, as a sort of "smelling salt" to assist labor.—S.

LEPUS WASHINGTONII, Baird.

Western Red Hare.

[For synonymy and description of this species, see chap. 2, p. 103.]

This species seems to replace the *Lepus sylvaticus* in the forest regions bordering the coasts of northern Oregon and Washington. One specimen (No. 142) obtained by me from British America, near the fifty-fifth parallel of north latitude, shows that this hare has a considerable range north and south. I doubt very much whether the species turns white in winter. The Indian from whom I obtained No. 142 assured me positively that it *never* turns white, and seemed to think with me that the other two skins, which were *white*, purchased at the same time, belonged to a different species. I have obtained the *Lepus Washingtonii* at Puget Sound at all seasons; those killed in mid-winter showing no trace of a white winter coat. It *may* be that some hares have the property of changing the color only during very severe cold weather, such as is rarely experienced in the vicinity of Puget Sound—the *degree of cold*, perhaps, regulating the change.

I preserved a specimen in June, 1856, which was killed on White river, near Puget Sound.

No. 104.—Measurements.

Head to root of tail.....	16.50 inches.
Tail vertebræ, about.....	1.60 "
Tail to hairy tip.....	2.50 "
Head to tip of nose.....	4.00 "
Height of ears from plane of occiput.....	3.87 "
Outstretched ears, from tip to tip.....	8.25 "
Folded ears project beyond nose.....	.50 "
Easy girth of head in front of ears.....	5.75 "

Length from olecranon to end of longest nail.....	5.36 inches.
Length from heel to end of longest toe-nail.....	4.50 "
From greater trochanter to end of toe-nail.....	11.00 "
Span of fore and hind legs, extreme reach.....	29.00 "
Length of longest whisker bristle	3.60 "

Chin and upper portion of throat white. A white linear streak under each nostril, below which a line of the same color as the cheeks. Whiskers, some black; the others white; the latter longest. Toe-nail "coverts" *white*. External (posterior) edge of concave surface of ear *white* upon a subterminal edging of black. Hairs of breast and abdomen white to their bases. Eyes full.

This hare is frequently found in the very thickest of the sombre Oregon forests. It also is plentiful among the scrub-oak bushes near the small lakes, on the Nisqually plains, where their well-beaten trails or "run ways" are very apparent. They are also fond of the woody edges of the prairies of that vicinity. In habits they much resemble the common wood hare of the middle States, (*L. sylvaticus*.)

I have frequently heard of a hare that is found at the cascades of the Columbia, which, the settlers say, has a *black* tail. I never obtained a specimen from that locality, although I got a skin of the *Lepus Washingtonii* from a point only forty miles further down the river. I apprehend that the "black-tailed hare" of the settlers is nothing more than the latter species, the dark *lead color* of the tail being mistaken by inaccurate observers for black.—S.

LEPUS CAMPESTRIS, Bach.

Prairie Hare; Townsend's Hare.

[For Sp. Ch., see chap. 2., p. 104.]

The big hare, or jackass hare of the plains, is abundant on the plains of the Columbia east of the Cascades. In 1853 we were informed by the Yakima Indians living north of the Columbia that a very fatal disease had recently prevailed among these animals, which had cut them almost all off.—G.

Townsend's hare was obtained by me from two points quite remote from each other: the Missouri river, near the mouth of the Yellowstone, and the eastern slope of the Blue mountains of Oregon!—(See notes on these, chap. 2, p. 104.)

Between the two points mentioned I saw in very cold weather, in the second chain of Rocky mountains, near Clark's fork of the Columbia, a large hare, which was *pure white*, running through the forest on the snow. I have but little doubt that the individual belonged to the present species, which tends to settle the doubt, if any had previously existed, whether the kind varies in winter. The Missouri specimen was scarcely as large as that from Oregon, and was probably immature. Measurements: forearm, 4.75 inches.; femur, 4.75; tibia, 5.50.—S.

?LEPUS CALLOTIS, Wagler.

Jackass Rabbit; Texas Hare; Black-tailed Hare.

[See chap. 2, p. 104.]

These hares are exceedingly abundant on the left bank of Boisé river, where they were so plentiful that a party of sixty men, to which I was attached, subsisted chiefly upon them for a

week. In a short ride of an hour's duration I have frequently seen as many as thirty individuals either running about the trail or sitting among the "sage" bushes on either side. Sometimes three or four might be seen at once. I presumed at the time that they were thus abundant in that immediate vicinity by reason of its proximity to water, the great drought having driven them in from the vast arid sage plains of the surrounding country. I saw none on the left bank of Snake river, and met with no hares after crossing that stream from the opposite side (at the mouth of Boisé river) until in going norththwest we had proceeded about seventy miles, when I fell in with a specimen of *L. campestris* at Powder river.

These hares breed in great numbers on the sage plains south of Boisé river, and, I was told, turn white in winter. Concerning this point there may be a mistake, my informants taking the *L. campestris* for this species.

The flesh is rather bitter, as in the case of the *sage cock*, owing probably to the artemisia upon which it feeds.—S.

LEPUS CALIFORNICUS, Gray.

California Hare.

(See chap. 2, p. 104.)

I saw a large species of hare at the head of Russian and Eel rivers, California. I also killed one of great size in the mountains, between Salmon and Trinity rivers. There is a bluish hare very common around Humboldt bay, where the Indians make blankets or robes of their skins, by cutting them into strips, which are twisted with ropes, and then stretched on a frame and woven.—G.

LEPUS ARTEMISIA, Bach.

Sage Hare.

BAIRD, Gen. Rep. Mammals, 1857, 602.

SP. CH.—Similar to the common rabbit, *Lepus sylvaticus*, but smaller and grayer.

Hab.—Interior of Oregon and Nebraska.

The little sage hare is very abundant in the open central region of Oregon. It is, as its name implies, especially fond of the vicinity of bushes of the so-called "wild sage," or artemisia, under which it sits motionless and invisible, in almost perfect security. Several specimens were brought to me at Fort Dalles, the skins of which were preserved, and the measurements recorded.

Measurements of specimen.

No. 50. March 2. Length to root of tail, 12 inches; tail to end of vertebræ, 2; of hairs, 2.50.

No. 35. January 12, 1855. Under surface of tail, I am told, by Indians is white; that of this specimen was lost. At the time this individual was brought to me I was told that the species does not turn white in winter. Name in dialect of the Wascos, *La-lek*.

Length from nose to root of tail.....	15 inches,	0 lines.
Heel to point of longest nail.....	3 "	8 "
Height of ear above plane of crown.....	3 "	3 "
Ear to point of nose.....	2 "	10 "
Tail vertebræ, about.....	1 "	4 "
From olecranon to end of longest nail.....	4 "	2 "
Extreme stretch between fore and hind toes.....	24 "	0 "

Ear as long as the head; small intestines, about 6 feet 9 inches long; stomach about 3; coecum very long; ilium contained 4 taenio.—S.

NOTE.—There are three species of hare said to occur in Oregon, to which I can gain no clue. These are the *Lepus palustris*, *Lepus Nuttallii*, and *Lagomys princeps*, or Little Chief Hare. The first of these, known in the Atlantic States as the *marsh hare*, is contained in Townsend's list of Oregon Mammals. Doctor T. was probably in error, mistaking the *L. Washingtonii*, or the present species, for it.—S.

ALCE AMERICANA, Jardine.

Moose.

BAIRD, Gen. Rep. Mammals, 1857, 631.

I believe that moose are found west of the Rocky mountains, to the north, but do not think that they occur at present west of the Cascades, and it is even doubtful whether they formerly existed there, although I have heard of *horns* of the *species* being found, but have never seen them. The Indians say that there is another large animal of the deer kind, not the *elk*, which is found in the timbered district between Puget Sound and the sea, on the Quinatt stream. Their statements cannot be much relied on.—G.

NOTE.—I have obtained from Dr. Webber, of Steilacoom, a skull of an animal of the deer kind which the Indians say was formerly very plentiful, but now exterminated, and which they call in the Chimook jargon the *massache maivitch*, or bad deer. Several similar skulls have been obtained on the Steilacoom Plains. This skull was sent to Washington, but was unfortunately lost on the way.

The *cariboo* is said by the employés of the Hudson Bay Company to extend in the Rocky mountains as far south as the Kootenay country, which lies near the 49th parallel.—G.

It is said by the residents on Bellingham bay that the moose is found on the Nooksahk river. Perhaps the animal they refer to is the cariboo, or reindeer. I have never seen the horns of either in the vicinity of Puget Sound, except a pair of moose horns which I brought myself from another part of the country, which had been obtained in the most eastern part of Washington Territory, near the St. Mary's valley, in the Rocky mountains. These I showed to a number of Indians about Fort Nisqually, Puget Sound, who all appeared much astonished, and declared that they knew nothing about the animal.

The same horns are now in the museum of the Smithsonian Institution. I am told that moose are very common in the Rocky mountains near where these were obtained, and that they attain a very large size.—S.

CERVUS CANADENSIS, Erxl.

American Elk.

BAIRD, Gen. Rep. Mammals, 1857, 638.

The elk extends throughout the mountainous timbered districts of Washington and Oregon Territories, and all the way down the coast to San Francisco. I suppose that the range of the species from the Rocky mountains to the Pacific has been by the line of the heavily timbered Cascade mountains. In the mountains west of Astoria they are as abundant as they were in the days of Lewis and Clark.

Judge Ford, long a settler in Washington Territory, and an enthusiastic hunter, says that the elk of the Pacific coast is not the elk of the "plains," but has a *larger* and *coarser* head. He has been, through life, familiar with game, and is *positive* that they are different animals.—G.

Elk are found in the Rocky, Cascade, and Coast ranges of mountains. They are, perhaps, most abundant on the last mentioned chain throughout its whole course through Oregon and Washington Territories. In the latter they are especially abundant on the headwaters of the branches of the Chehalis river, and also upon the northern slope of the Coast range, back of Port Discovery and Sekwim bay. Near the last locality they are very abundant during the winter, being driven down by the snows on the mountains. They run in large droves, following well beaten trails, and at that season are an easy prey to the hunter. In January, 1857, two men in the vicinity of Sekwim bay killed eleven fine elk in one day. I obtained but one skin during my stay in the Territory. This was found at an Indian lodge, at the mouth of the Lummi river, a few miles from the coal mines on Bellingham bay. The skin is now in the Smithsonian collection, but I fear is in too imperfect a condition to admit of accurate comparison with others from the east side of the Rocky mountains. Elk are abundant in certain sections of California, and I myself saw a very handsome pair of half grown individuals exhibited alive in a menagerie at San Francisco. They were a handsome symmetrical pair of beasts, of a cream or light fawn color, and were quite tame and in good order, apparently bearing their confinement well. Elk were killed by our men in Minnesota as far west as the Red River of the North. They were then not seen until we reached the Missouri, but became quite plentiful as we approached the Rocky mountains, frequently going in large bands.—S.

CERVUS VIRGINIANUS, Boddaert.

Virginia Deer.

BAIRD, Gen. Rep. Mammals, p. 643.

Among a number of deer skins from Fort Steilacoom, sent by me to the Smithsonian collection, were several apparently belonging to this species. I regret that their imperfect condition precluded absolute determination.—S.

(See notes on next species.)

CERVUS LEUCURUS, Douglas.

White-tailed Deer.

Cervus leucurus, DOUGLAS, Zool. Jour. IV, Jan. 1829, 330.

RICHARDSON, F. Bor. Am. I, 1829, 258.

AUD. & BACH. N. Am. Quad. III, 1853, 77; plate cxviii.

BAIRD, Gen. Rep. Mammals, 1857, 649.

Long-tailed red deer, LEWIS & CLARK.

SP. CH.—Horns and gland of the hind legs as in *C. virginianus*; tail appreciably longer; hoofs long and narrow; fur compact. General color above, in autumn, yellowish gray, clouded and waved, but not lined with dusky. Chin entirely white, with only a small dusky spot on the edge of the lip. Ears gray, with a basal white spot behind. Anal region and under surface of the tail, but not the buttocks, white. Tail reddish above, without exhibiting any dusky.

The white-tailed deer is well known to the Indians near Fort Steilacoom; at least they describe a deer *not* the *C. columbianus*, which they call *skehgrouts*. Another species, not the *black-tailed*, is known as the *long-tailed* deer, and is called *spt-ko-bsh*. The latter, they say, inhabits the small groves and the shrubby borders of the lakes on the prairies of that vicinity. About these distinctions in species they are positive. Perhaps one may be the red deer, (*C. virginianus*), of which Professor Baird seems to think there are indications among the skins in my collection. A pair of horns, apparently belonging to the *C. leucurus*, Dougl., were obtained by me at Whidby's island, Puget Sound.—S.

CERVUS MACROTIS, Say.

Mule Deer.

BAIRD, Gen. Rep. Mammals, 656.

Several experienced hunters have assured me that the mule deer has been killed by them on the eastern slope of the Cascade mountains, within the limits of Washington Territory.—S.

CERVUS COLUMBIANUS, Rich.

Black-tailed Deer.

Cervus macrotis, var. *columbianus*, RICHARDSON, F. B. Am. I, 1829, 255; pl. xx.

Cervus columbianus, BAIRD, Gen. Rep. Mammals, 1857, 659.

Cervus lewisii, PEALE, Mammalia and Birds U. S. Ex. Ex. 1848, 39.

Cervus richardsonii, AUD. & BACH. N. Am. Quad. II, 1851, 211.—IB. III, 1853, 27; pl. cvi.

Black-tailed fallow deer, LEWIS & CLARK.

SP. CH.—About the size of *C. virginianus*, or less. Horns doubly dichotomous, the forks nearly equal. Ears more than half the length of the tail. Gland of the hind leg about one-sixth of the distance between the articulating surfaces of the bone. Tail cylindrical, hairy and white beneath; almost entirely black above. The under portion of the tip not black. Winter coat with distinct yellowish chestnut annulation on a dark ground. Without white patch on the buttocks. There is a distinct dusky horse-shoe mark on the forehead anterior to the eyes.

Lewis and Clark includes this species among the *three* kinds of deer which, they say, inhabit Oregon. The other two of these are the common *red deer* and the *mule deer*.

The black-tailed deer I found the most common kind on the Klamath mountains and in Shasta valley. The Klamath mountains sustain a mixed and rather open forest of pine, oak, and other trees, both evergreen and deciduous. The black-tail, though much larger than the red deer, is inferior for the table, the meat being generally dry and of indifferent flavor.

I have seen it stated that a characteristic of the black-tailed species is, that the horns *bifurcate equally*, each of the double prongs having points. This is certainly *not* universal; for, although I have seen horns forked in that manner, I have seen *more that were single*.—G.

NOTE.—As a general rule it may be observed, that American Oregon is not a hunting country, especially that portion of it west of the Bitter Root and Blue mountains. What few fur-bearing animals there were once are now again increasing, especially the *beaver*. The Indians, however, are greatly diminished in numbers, and, moreover, hunt much less than formerly. With their natural improvidence they have, on the other hand, destroyed the *deer* in certain districts, as, for example, that on the eastern slope of the Cascade mountains.

The possession of fire-arms has been, in many respects, an injury to the savages, leading them to the wanton slaughter and destruction of the deer during heavy snows.—G.

The black-tailed deer is, by far, the most numerous species in the heavily-wooded districts west of the Cascade mountains. Its range, in all probability, extends from as far north as the northern limits of the dense forests of the coast to near San Francisco, in California, and, perhaps, still further south in the Sierra Nevada mountains. On Puget Sound, although apparently not the only species, it far exceeds any other kind in numbers. It frequents the dense forests of Douglass fir which there exist, and, unless hunted with dogs, is generally very difficult to obtain. During several years' residence at Fort Steilacoom I had occasional opportunities of seeing this deer, either alive or dead. It has nearly the same habits as the red deer, and although, at times, fond of visiting the borders of prairies, or the weedy edges of ponds and lakes, its principal residence is in the sombre forests of the region. In winter they approach the coast or the vicinity of the salt water, probably having found, by experience, that the

temperature is much warmer, and their chances of obtaining a full supply of food much greater there than in the interior. In April or May they retreat to the interior, and to the foot-hills and spurs of the Cascade mountains, where they remain until the next cold weather—during the interval rearing their young. The fawns are usually dropped about the last of May, the dam frequently having two at a birth. They are spotted with white, resembling closely the young of the Virginian deer.

A fine male black-tailed deer was killed near White river, about thirty miles northwest of Fort Steilacoom, on the 28th of March, 1856. The skin was preserved and sent to Washington city. This deer had no horns, having apparently recently shed them. Its ears, when mutually abducted their fullest extent, measured, from tip to tip, 23 inches; from occiput to tip of nose, 16 inches; circumference behind shoulders, 3 feet 7 inches. The buck was considered very large.

The name of the black-tailed deer, in the Nisqually language, is *stub-eh-o-otl*.—S.

NOTE.—The deer of Whidby's island, Puget Sound, are remarkable for the fact that frequently white and mottled individuals are found among them. To what species they belong I am uncertain, but presume they are mere varieties or albinos of the present species, which certainly exists in great numbers on that island. In this opinion Mr. Gibbs coincides with me.—S.

ANTILOCAPRA AMERICANA, Ord.

Prong-horn Antelope; Cabree.

BAIRD, Gen. Rep. Mammals, p. 666.

Lewis and Clark mention that the antelope exists on the great plains of the Columbia, though by no means as abundant as east of the Rocky mountains. I suspect that they are nearly if not quite extinct there, as I have never met them. Neither have I ever heard of them in Oregon west of the Cascades. I however saw them in large droves in the Shasta valley, and suppose that they occur on the plains of California generally.—G.

The antelope is, without doubt, sparingly found in Oregon; but unless stragglers occur on the Spokane plains, it is doubtful whether it enters Washington Territory. Townsend corroborates Lewis and Clark's statement that they are found in Oregon, and I myself have been on expeditions in the vicinity of Snake river when some members of our party have seen them. They are said by the Indians to have been formerly quite plentiful at the Dalles of the Columbia, but they are now nearly exterminated in that locality. A few, however, are still found at the warm springs near the sources of John Dea's river, about 100 miles from Fort Dalles.—S.

APLOCERUS MONTANUS.

Mountain Goat.

Ovis montana, ORD, Guthrie's Geography (2d Am. Ed.) II, 1815, 292, 309.—Jb. J. A. N. Sc. I, 1, 1817, 8.

Aplocerus montanus, RICHARDSON, Zool. of Herald; Fossil Mammals, II, 1852, 131; pl. xvi-xix. Osteology.

BAIRD, Gen. Rep. Mammals, 1857, 671.

Capra americana, BAIRD, Rep. U. S. Pat. Off. Agricultural for 1851, (1852,) 120; plate. (From Rich.)

AUD. & BACH. N. Am. Quad. III, 1853, 128; pl. cxxviii.

Rocky Mountain Sheep, JAMESON, "Wernerian Transactions, III, 1821, 306."

Mountain Goat, *Mountain Sheep*, *White Goat*, &c., VULGO.

Wow of the Yakima, Walla-Walla, and Klickitat Indians.

SP. CH.—Entirely white. Horns, hoofs, and edge of nostrils black. Hair long and pendant. A beard-like tuft of hair on the chin.

This animal, described by Lewis and Clark, vol. 3, pp. 117, 118, is the American mountain

goat, common to both the Rocky and Cascade mountains, and is wooly, somewhat like the domestic sheep. The fact that the explorers above mentioned had only seen *skins* accounts for their imperfect descriptions, as well as for the inconsistent accounts they give of their horns. There is a curious story, common among mountain men, that in leaping from precipices it alights on its horns and rebounds without injury! I have never heard of this species in California, though they may exist in the Sierra Nevada. The Yakimas and Snoqualme Indians get them in the Cascade mountains, north of the Columbia, in latitude $47^{\circ} 30'$. They were formerly, if not now, abundant on Mount Hood.—See Lewis and Clarke's narrative.—G.

I have obtained several hunters' skins of the mountain goat from the localities north of the Columbia river mentioned by Mr. Gibbs. Mr. Craig, an old Indian trader, and at present United States Indian agent, among the Nez Percés, says that these animals are quite abundant in the mountains near the Kooskooskia and Salmon rivers, streams which empty into Snake river, and that in the country of the Nez Percés, about forty miles from his residence, they are found in *great numbers* on the bald hills and bare mountains of the locality, and that upon these they can be seen from a great distance feeding in "large droves." He says that the *male* is *white*, the female similar but *tinged with yellow*, and that the horns are strong and of a beautiful jet black.

I have seen dozens of hunters' skins of these animals in the lodges of the Indians on Whidby's island, Puget Sound. They were obtained from the Indians living about Mount Baker in the Cascade range. Skins obtained by the late Lieutenant John Nugen and myself are now in the Smithsonian collection.—S.

OVIS MONTANA, Cuv.

Bighorn; Mountain Sheep.

BAIRD, Gen. Rep., Mammals, p. 673.

The Bighorn Sheep.—There are several rocky prominences in northern California which, among the old hunters and trappers, have the name of "Sheep rocks," where the bighorn exists, or did exist until recently. One of these lies to the north and east of Shasta butte, (or Mount Shasta,) in the range bordering Shasta valley on the east. Another locality is a singular and conspicuous point between Scott and Shasta valleys. It also exists, I am told, in the recesses of the Cascade mountains, but of this fact, or of its being found in the Olympic (Coast) range in Washington Territory, I am uncertain. The natives of the northwest coast north of $54^{\circ} 40'$ make spoons from a substance which I suppose to be their horns, and if so, they undoubtedly exist as far north as that point. An old trapper told me that he had once witnessed an encounter between a bighorn and a black bear, in which the latter was worsted and had to retreat, the ram having knocked him down three times.—G.

The Mountain Sheep, (Tinoon of the Walla-Wallas?) is said to be found on Mount Hood, near Fort Dalles, Oregon. I once saw a large horn in use as a plaything by some Indian children at the Dalles, which appeared to belong to this animal, but was much smaller than is common. I have eaten the mutton killed in the Rocky mountains, west of the dividing ridge, within the limits of Washington Territory. The flesh is very good, tasting much like the mutton of tame sheep, having the same peculiar flavor, only a little stronger. They are said to abound in the Black Hills and "Mauvaises Terres of Nebraska."—S.

BOS AMERICANUS, Gmelin.

American Buffalo; Bison.

BAIRD, Gen. Rep., Mammals, 682.

The American Buffalo.—Jedediah S. Smith says that prior to 1830 the *most western limit* of this animal was at the head of the river Malade, (a branch of Snake river,) heading in the Salmon River mountains. Angus McDonald, esq., of the Hudson Bay Company, tells me that he found a buffalo skull in the cañon of Snake river, at the foot of the Great Shoshonee Falls, eight miles above Rock creek. Wilkes, or Frémont, gives the Pont Neuf as their boundary in 1841. In 1845 they left the valley of Bear river, and I doubt whether they now cross Green river, or even come through the South Pass. Formerly, it is said, they were quite plentiful in the British possessions *west* of the Rocky mountains. I was told in 1853, by an old Iroquis hunter, that a lost bull had been killed twenty-five years before in the Grand Coulee; but this was an extraordinary occurrence, perhaps before unknown.—G.

The only buffalo that I have heard of which has been killed within late years north of the South Pass and *west* of the Rocky mountains was a "lost" bull, which was seen and killed at Horse Plain, at the junction of the Flathead and Hell Gate rivers, on the day I passed it on my canoe voyage in November, 1853. The Indians were in great glee, saying "The buffalo are *coming back* among us!" a hope in which, it is needless to say, they have been disappointed. Their remark, however, would indicate that these animals formerly were abundant in the valleys on the headwaters of Clark's Fork of the Columbia.—S.

ANIMALS INTRODUCED INTO OREGON AND WASHINGTON TERRITORIES.

Horned Cattle.

Horned cattle of the wild Spanish variety were introduced into Oregon from California a few years ago by the Hudson Bay Company. Having increased rapidly, in 1850 there were about 4,000 head on the Nisqually plains. Although private property they have become so wild that they have to be hunted and killed on horseback, like buffalo. Owing to the rapid settlement of the country and to other causes, these wild cattle are now (1855) becoming rapidly exterminated. The jargon word for cattle is *Moos-moos*, and is a corruption of *Moos-moos-chin*, the Walla-Walla word for *buffalo*.—G.

The California cattle are now done away with to a great extent in both our northwestern Territories, having given place to the better breed of domestic stock which have been driven across from the valley of the Mississippi. It is said that a cross between the two kinds adds great hardiness to the stock, and that a dash—say one-fourth or one-eighth—of the Spanish blood is really an improvement to the breed.—S.

The Horse.

The Yakimas (living north of the Columbia) say that they first obtained the horse from the Flatheads. The latter probably got them from the Snakes, who, in their turn, probably obtained them from the Comanches. Garry, the Spokane chief, cannot say how long it is since his tribe got them. Lewis and Clark's description of the standard of the Oregon horse is far superior to that of the present stock. It is probable that they have much deteriorated by promiscuous breeding, and by the introduction of the *white* horse.

Lewis and Clark say, "some of these are pied, the greater part, however, are of a uniform tinge, marked with stars, white feet," &c. At present, although there are some really fine individuals among them, the mass are in a great measure *white*, with "glass" or "wall" eyes, &c. It would be interesting to decide where the white stock came from. The California horse shows but little of the white admixture.—G.

There are old men now living at the Dalles and among kindred tribes in the vicinity who say that they remember seeing other old men who were living when the horse was first introduced among them. They say that the first horses obtained were looked upon as great curiosities, and as their use was not known, the animals were kept merely for show and as pets. They were led about in the festive processions, and were present at all dances and fetes. This must have been about 125 years ago.

Camotrisspellum, the old war-chief of the Cayuses, says that they were obtained of the Snakes, thus confirming Mr. Gibbs' supposition. They are a hardy race and remarkably free from disease, lameness, or other ills that horse flesh is liable to. An instinct which appears universal among them is to jump "stiff-legged," or "buck-fashion," when first mounted for breaking. This vice is said to be rare among the horses of the older States.—S.

NOTE.—Other domestic animals have been introduced into Oregon and Washington Territories. Among these are sheep, asses, goats, eastern horses, dogs, pigs, cats; all of which thrive very well. The sheep, however, owing to the abundance of wolves, as a general rule, require guarding by shepherds, especially east of the Cascades. On the Nisqually plains, the Puget Sound Agricultural Company (an offshoot of the Hudson Bay Company) possess a large number, their flocks in 1855 containing 11,000 individuals.—S.

No. 3.

REPORT UPON THE BIRDS COLLECTED ON THE SURVEY.

CHAPTER I.

LAND BIRDS, BY J. G. COOPER, M. D.

ORDER I. **RAPTORES.** Birds of Prey.

Family **VULTURIDAE.** The Vultures.

CATHARTES AURA, Illiger.

The Turkey Buzzard, or Vulture.

Vultur aura, LINN. Syst. Nat. I., 122, (1766.)

Cathartes aura, ILLIG. Prod. Syst., p. 236.

Cathartes aura, (LINN.) CASSIN, Gen. Rep. Birds, p. 4.

C. septentrionalis, DE WEID, Reise, I, 162, (1839.)

FIGURES.—Wilson Am. Orn. IX, pl. 75, fig. 1; Aud. B. of Am. pl. 151, oct. ed., I, pl. 2.

SP. CH.—Bare skin of head and neck, red. Female: length about 30; wing, 23; tail, 12 inches. Male smaller, (as in all rapacious birds.)

The turkey buzzard is very abundant during summer in all parts of the Territory I have visited, frequenting the vicinity of prairies and river banks, and never appearing along the coast. They arrived at Puget Sound about the middle of May, and flocks of them could be seen daily about the carcasses of sheep; but I never observed any other species in company with them. I have not seen their nests, but have no doubt that they build in the Territory.—C.

The turkey vulture was found by me both at Fort Dalles, Oregon Territory, and on Puget Sound, Washington Territory. It is, however, but sparingly abundant. On the Nisqually plains I frequently saw them in couples, or sometimes in small groups of half a dozen, surrounding dead sheep or other carrion.

On the route of the Northern Pacific Railroad survey I shot one of these birds on the Bois des Sioux river, which is a tributary of the Red River of the North, and not far from Pembina, thus corroborating Mr. Say's statement of having observed them in that place.—S.

CATHARTES CALIFORNIANUS, Cuvier.

The California Vulture.

Vultur californianus, SHAW, Nat. Misc., pl. 301, (1779.)*Vultur columbianus*, ORD, Guthrie's Geog., II, 315, (1815.)*Cathartes vulturinus*, TEMM. Pla. col. I, pl. 31, (1820.)*Cathartes californianus*, CUVIER, Regne An. ed. Ib. 2, p. 316.

BAIRD and CASSIN, Gen. Rep. Birds.

FIGURES.—Aud. B. of Am., pl. 411, oct. ed. I, pl. 1; GRAY, Gen. of Birds, I, pl. 2.

The largest rapacious bird of North America. Head and neck bare, with a semicircular spot of short black feathers at the base of the upper mandible, and a few straggling, short, or hair-like feathers on other parts of the head. Plumage commencing on the neck, near the body, with a ruff of long lanceolate feathers continued on the breast.

Entire plumage black, lustrous on the upper parts, duller below; secondary quills with a grayish tinge; greater wing coverts tipped with white, forming a transverse band on the wing. Bill yellowish white; iris carmine; head and neck in living bird orange yellow and red.

Total length, 45 to 50 inches; wing, 30 to 35; tail 15 to 18 inches.

Hab. Western North America. Spec. in Nat. Mus. Washington, and Mus. Acad. Philadelphia.

The Californian vulture visits the Columbia river in fall, when its shores are lined with great numbers of dead salmon, on which this and the other vultures, besides crows, ravens, and many quadrupeds, feast for a couple of months. While the expedition was travelling near the upper Columbia, in the fall of 1853, I saw none of this species, though turkey buzzards were common, and I concluded that these did not extend their wanderings eastward of the Cascade mountains. On our return to Vancouver, November 18, none were to be seen there, and as the rainy season had set in I supposed they had retired south. In January, 1854, I saw, during a very cold period, a bird which I took for this, from its great size, peculiar flight, and long bare neck, which it stretched out as it sat on a high dead tree, so as to be scarcely mistakable for any other bird. The river being then frozen solid, and the ground covered with snow, it did not appear to admire the scenery and soon started off towards the south. During several voyages on the Columbia, in summer and spring, as well as a long residence near its mouth, I never again saw this bird, and must consider it only a visitor at certain seasons, and not a resident even during summer. Townsend supposed he saw its nests along the Columbia, but did not examine them, and was probably mistaken. I neither saw it nor heard of its occurrence at Puget Sound.—C.

The Californian vulture, according to Nuttall, (see Manual, 2d ed.,) is a summer resident of Oregon; Townsend and Audubon also speak of its occurrence there. It was my misfortune to be absent from the main salmon fisheries at the annual period, when this bird is said to be abundant, and I was therefore unable to obtain, or even see, a single individual. I do not doubt the correctness of Mr. Nuttall's statement, and am pleased to bear testimony to the great general accuracy of his recorded observations concerning the natural history of Oregon. Since his *manual* was written the old "Territory of Oregon" has been divided, and its northern portion, or all that lying north of the Columbia and east of Walla-Walla, of the 46th parallel, now forms the Territory of Washington. The fauna of both Territories is very similar and, with but few exceptions, the statement that a bird or quadruped is found in one is very presumptive evidence that it is, at least, accidental in the other.—S.

Family FALCONIDAE. The Falcons.

Sub-family FALCONINAE. True Falcons.

FALCO NIGRICEPS, Cassin.

The Western Duck Hawk.

Falco nigriceps, CASSIN, Birds of Cal. and Tex., I, p. 87, (1853.)—IB. in Gilliss' U. S. Astron. Exped., II, (1855,) pl. xiv.—BAIRD & CASSIN, Gen. Rep. Birds, p. 8.

SP. CH.—Above bluish cinereous, narrowly banded with black; below reddish, with circular spots, and bands of black on sides. Crown and cheeks nearly black. Female: length 15 to 17½ inches; wing, 11 to 12; tail, 6 to 6½.

Younger: above dark brown; tail barred with rufous on inner webs; beneath reddish yellow, with broad stripes of black.

Adult: resembling the common duck hawk of the eastern coast, (*F. anatum*), but smaller, and with the bill disproportionately weaker. Head and neck above black, and a large black space on cheeks.

Specimen No. 8501, original No. 63. Dimensions when fresh: Length, 17.25; extent, 39.50. Iris hazel, bill whitish blue, feet yellow. Plate xi (birds) represents this specimen.

Of the western duck hawk I have seen only two pairs, which, in March, 1854, frequented a high wooded cliff at Shoalwater bay. Often as I passed underneath they would fly round over my head, and I succeeded in shooting two of them, which were marked exactly alike. The other two, from their larger size, I supposed were females, and they soon after left the neighborhood. I supposed from their keeping about the same spot that they intended to build there.—C.

In the summer of 1856 Mr. George Gibbs, of Steilacoom, W. T., presented me with a specimen of this bird, killed near his farm. This was forwarded to the Smithsonian Institution museum. I know nothing respecting its habits.—S.

FALCO COLUMBARIUS, Linnaeus.

The Pigeon Hawk.

Falco columbarius, LINN. Syst. Nat., I, 128, (1776.)—WILSON, Am. Orn. II, pl. xv, fig. 3.—BAIRD & CASSIN, Gen. Rep. Birds, p. 9.

Falco columbarius and termerarius, AUD. B. of An., pl. lxxii and xcii; oct. ed. I, pl. xxi.

Hypotriorchis columbarius, Newberry, P. R. R. Rep., vol. VI, p. 74, (Birds.)

SP. CH.—Small and stout in form; above bluish slate color, with black lines; beneath pale yellowish or reddish white, each feather with a black stripe. Tail with one wide dark band, and several (about three) narrower bands of black.

Younger: dusky or light brown; sometimes with ferruginous markings; beneath dull white, with light brown stripes. Tail pale brown, with about six white bands.

Young: brownish black, the white parts dusky, stripes wider, sides with black bands and white spots; quills and tail nearly black, the tail with about four white bands, or unspotted.

No. 4476, adult female, Straits of Fuca, April, 1855. Length, 12.50; extent, 27 inches.

No. 4475, adult male, Santa Clara, Cal., November, 1855. Length, 11.75; extent, 23.50.

No. 4477, young male, Shoalwater bay, August, 1855. Length, 10.25; extent, 22.50.

Iris brown, bill bluish black, cere and feet yellow, in all the specimens.

The pigeon hawk seems to be rather uncommon in the Territory. I shot one in June, 1853, and did not see another until April, 1855, when they had just arrived at the Straits of De Fuca. I was surprised one day by an unusual screaming of some bird close to the house, and going out I found that one of these hawks had just caught an unfortunate flicker, which probably feared no assault from a bird no larger than itself. Its weight brought the hawk to the ground, where I immediately shot it. On picking it up the flicker, though unhurt either

by the hawk or my shot, was so frightened that it made no effort to escape from the claws which still held it with the grasp of death. When I released it it flew to a tree near by, and for some time showed its astonishment and joy by loud cries.

As the pigeon hawk is found in summer, it doubtless breeds in the Territory. In August, 1855, I shot one of a small family of young which had but lately left the nest. They probably migrate southward in winter, as I found them abundant in California in October and November.—C.

About the 1st of August this bird becomes very abundant in the vicinity of Fort Steilacoom, W. T. During the summer and autumn of 1856 I obtained a number of specimens in different stages of plumage. Several of these had regular oval spots of rust or cinnamon color on the inner vanes of the primaries. In this character these birds appear to resemble the bird noticed by Cassin in the birds of "California, Texas," &c., among the "doubtful and obscure" North American species, *Falco obscurus*, Gm.—(Cassin's work, page 118, vide quotations from Pennant.)

I think that near Puget Sound this species breeds in the recesses of the Cascade mountains, not coming down upon the open plains until late in the summer.—S.

FALCO POLYAGRUS, Cassin.

The Lanier Falcon.

Falco polyagrus, CASSIN, B. of Cal. and Texas, I, p. 88, pl. 16, (1853.)

BAIRD & CASSIN, Gen. Rep. Birds, p. 12.

SP. CH.—Above brown, quills and tail grayish, tail with white bands. A brown strip from the corner of the eye downwards, and narrow brown stripes and spots below; also a large brown patch on breast near shoulder and another on flanks. Forehead, cheeks, and under parts white.

The young has the white parts much more obscured with brown; upper parts paler brown, with rufous streaks.

Female: length, 18 to 20 inches; wing, 13 to 14; tail, $7\frac{1}{2}$ to 8.

This hawk is not at all rare in Oregon. I was fortunate enough to obtain a specimen of it at Fort Dalles, O. T., in the beginning of the winter of 1854-'55, which was killed while in the act of carrying off a barnyard fowl, of about its own weight, that it had just seized from near the door of a dwelling house. This action of the bird seemed to denote that, as a species, it is not inferior in strength, resolution, and ferocity to either the other falcons or the buzzards.—S.

FALCO SPARVERIUS, Linnaeus.

The Sparrow Hawk.

Falco sparverius, LINN. Syst. Nat. I, 128, (1766.)

BAIRD & CASSIN, Gen. Rep. Birds, p. 13.

F. dominicensis, *cinnamoniensis*, and *isabellinus*, SWAINSON, Cal. Cycl. p. 281.

Figured in Wilson's Am. Orn., II, p. 16, f. 1; Aud. B. of Am., oct. ed.

Tinnunculus sparverius, NEWBERRY, P. R. R. Rep., vol. VI, p. 74.

SP. CH.—Easily distinguished by its small size, rufous or ferruginous upper parts, beautifully variegated with black and white. The young has the back much more barred, and numerous narrow bars on tail; a large blue patch on shoulders; spots beneath larger and mingled with stripes. Female larger and more like the young in colors than the male.

Male: length, $9\frac{1}{2}$ to 11; wing, 6 to 7; tail, $4\frac{1}{2}$ to $5\frac{1}{2}$.

Female: length, $10\frac{1}{2}$ to 12; wing, 7 to $8\frac{1}{2}$; tail, 5 to $5\frac{1}{2}$.

The sparrow hawk is extremely common during summer about prairies, even at the summit

of the Cascade range, but I have never observed it in the forests or near the sea shore. I noticed their arrival at Puget Sound early in May, and have only once seen what I suppose to have been this bird after October, although at that time I noticed differences of form and flight, which led me to think it might be another species. In my notes it is recorded that, in the snowy January of 1854, at Vancouver, "I saw a hawk colored like the sparrow hawk, but apparently of a stouter form and different mode of flight." I saw it only a few times, and was unable to obtain it.

I remarked nothing in its habits not observed in the very complete accounts given of it as occurring in the Atlantic States.—C.

I obtained several specimens of the *F. sparverius*, both at Puget Sound and Fort Dalles. They do not vary materially from those of other parts of North America, although, as in other situation, individuals vary slightly. In Oregon they are particularly numerous in the "oak openings" at the base of the Cascade mountains. I found this bird exceedingly abundant along the upper Missouri and its tributaries, wherever there was timber, or, at least, where the timber was sparse. They are not generally abundant in the thickly wooded districts; and I never met them in a broad prairie country, unless in the vicinity of "timber islands" or wooded streams.

It is exceedingly abundant on the Nisqually plains, Puget Sound, principally affecting the vicinity of small clusters of the oak. Those that I have noticed striking their prey, such as finches, small larks, &c., generally do so in the following manner: The hawk soars around and about the prairies at a short distance above the ground; upon discovering his victim quietly feeding in the grass, he makes a sudden downwards sweep, and generally succeeds in carrying off his victim. This hawk appears to delight in soaring about, in, and out of low trees, apparently for mere pastime. It also spends much time on the ground, probably in quest of grasshoppers and other insects. It is easily approached and killed. Two specimens sent from Puget Sound to the Smithsonian museum measured as follows: No. 346, ♂, April 20, 1856, 11, 23; No. 399, ♀, May, 1856, 11½, 23½ inches.—S.

Sub-family ACCIPITRINAE. Slender Hawks.

ASTUR ATRICAPILLUS, Bonaparte.

The Goshawk.

Falco atricapillus, WILSON, Am. Orn., VII, 80, pl. 52, fig. 3.

Astur atricapillus, BONAP. OSS. CUV. REG. AN., p. 33.

A. atricapillus, (WILSON,) BAIRD and CASSIN, Gen. Rep. Birds, p. 15.—NEWBERRY, P. R. R. Rep., vol. VI., Zoology, p. 74.

Falco palumbarius, LINN., Aud. B. of Am.; pl. 141; oct. ed., I. pl. 23.

SP. CH.—Above colored much like *F. nigriceps*, but much larger; and with the under parts mottled with narrow transverse lines of white and light ashy brown

Young: above dark brown, mottled with light reddish; tail light ashy, with five wide brown bands; underneath white or tinged with red or yellow; every feather with a brown stripe, mostly ending in an ovate spot.

Female: length, 22 to 24; wing, 14; tail, 10½ to 11 inches.

Male: length, 20 inches; wing, 12½; tail, 9½ inches.

No. 4516 (120,) Shoalwater Bay, January 20, 1855.

Young female: length, 24; extent, 44; tail, 11.50.

Iris yellow, bill bluish black and white, feet greenish yellow.

This bird I met with in a dense spruce forest, where it was devouring a squirrel on the ground. It flew into a tall tree and was so closely concealed that I only discovered it after a long search by seeing its tail move. I afterwards shot a beautiful specimen in full plumage, which came darting like lightning through the dark forest, and alighted so near me that I could see its flashing eye; but not being killed at once, it managed to escape among some underbrush and logs, where I sought it for an hour in vain. It would seem to be the special frequenter of dark woods, where other hawks are rarely seen.—C.

I obtained several specimens of the American goshawk, both at Fort Dalles and at Fort Steilacoom. The specimens collected were in different stages of plumage, one being a very fine specimen of the adult.

This hawk is bold, swift, and strong. It does not hesitate to sweep into a poultry yard, catch up a chicken and make off with it almost in a breath. The manner of seizing its prey is by a horizontal approach for a short distance, elevated but a few feet from the ground, a sudden downward sweep or side glance, and then, without stopping its flight, making its way to a neighboring tree or its nest with the struggling victim securely fastened in its talons.

Considering the size of this bird, for strength, intrepidity, and fury, it cannot be surpassed, these qualities almost rendering it feline in its character. It is also quite cunning, seizing very opportune moments for its attacks. It was not until many days that I was able to have a bird of this kind killed, although men were constantly on the watch for him. So adroit was he at seizing opportunities to make his attacks, that he would regularly visit our poultry yard twice and even thrice in a day, and yet always contrived to escape unmolested.

This species is frequently known among the Oregonians as the "*blue hawk*." The goshawk is found earlier than the others, and three specimens which I obtained were in most elegant adult plumage. Why the birds of this family become so plentiful for a few months I am unable to say, but think that, as above stated, having bred in the retired recesses of the Cascade and Coast ranges of mountains, they remain until their young are well able to fly, when they all descend to the open plains, where they can obtain a more abundant supply of food, such as finches, larks, robins, doves, band-tailed pigeons, meadow mice, moles, gophers, young rabbits, and even grasshoppers.—S.

ACCIPITER COOPERI, Gray.

Cooper's Hawk.

Falco Cooperii, BONAP. Am. Orn. II, 1, (1828.)

Accipiter Stanletii, AUD. Orn. Biog. I, 186, 1830.

Accipiter Cooperi, GRAY, List Brit. Mus., p. 38; Gen. B. sp. 6. (BON.) BAIRD & CASSIN, Gen. Rep. Birds, p. 16.

Astur Cooperi, NEWBERRY, P. R. R. Rep., vol. VI., Zool. p. 74.

FIGURES.—Bonap. Am. Orn. II, pl. 10, f. 1, Aud. B. of Am., pl. 36, 141, f. 3; oct. ed. 1, pl. 124.

SP. CH.—Above, ashy brown, darker on head and mixed with white; below, white, throat with narrow streaks, the rest with light rufous bars. Tail, dark cinereous, with four wide black bars. Young, pale brown above, mottled with white and rufous; beneath, white, with narrow light brown stripes.

This hawk is commonly confounded with others, under the name of "*chicken hawk*." It is very abundant in summer, and often killed about farm yards, where it seizes on chickens before the very eyes of the owner, darting down like lightning and disappearing again before he can

see what has disturbed his poultry yard. I believe it to be a constant resident, and to build in the Territory.—C.

Cooper's hawk is a common bird of prey in Oregon and Washington Territories. I obtained numerous specimens of it at Puget Sound and Fort Dalles. The characteristic variations in size and color of this bird hold good in Oregon, scarcely any two specimens being there found that are alike. An undoubted specimen of the *A. Cooperi*, shot at Fort Steilacoom in September, 1856, No. 5846, (590,) measured: length, 19; extent, 30 inches.—S.

ACCIPITER MEXICANUS, Swainson.

Blue-backed Hawk.

Accipiter mexicanus, Sw. Faun. Bos. Am. Birds, p. 45, (1831.)

BAIRD AND CASSIN, Gen. Rep. Birds, p. 17.

SP. CH.—Almost exactly like *A. Cooperi*, but smaller; back more brownish; throat and under tail coverts, white; other under parts more rufous, with white bars and spots; dark streaks only on breast. Young much tinged with reddish above; underneath, yellowish; each feather streaked and often barred near its base. Female: length, 17 to 18 inches; wing, 9½ to 10; tail, 9; extent, about 30. Male: length, 15 to 16 inches; wing, 9; tail, 8.—C.

This species of hawk I at first took for small individuals of the *A. Cooperi*, but the smaller size, the larger proportionate size of the tarsi, and other peculiarities, induced me to examine the bird more carefully. Upon comparing the specimens with Cassin's description of *A. Mexicanus* I found that they accorded.

An individual killed in the summer of 1856, at Port Townsend, Puget Sound, was shot near a salt marsh. While soaring about it resembled in its motions the common marsh hawk, or hen harrier.—S.

ACCIPITER FUSCUS, Bonaparte.

The Sharp-shinned Hawk.

Falco fuscus and *F. dubius*, GM. Syst. Nat. I, 280, 281, (1788.)

Accipiter fuscus, BONAPARTE, Comp. List, Birds, p. 5.

A. fuscus, (GM.) BAIRD AND CASSIN, Gen. Rep., Birds, p. 18.—NEWBERRY, P. R. R. Rep., vol. VI, Zool., p. 74

Falco velox and *F. pennsylvanicus*, WILSON, Am. Orn. V, 116, pl. 45, f. 1 and VI, p. 13, pl. 46, f. 1.

SP. CH.—Almost exactly like the two preceding in color, but much smaller. Young: above brown, beneath like young of *A. Cooperi* in color.

Female: length, 12 to 14 in.; wing, 7½ to 8; tail, 6½ to 7 inches, extent about 25 inches.

Male: length, 11 to 12; wing, 6 to 6½; tail, 5 to 5½.

No. 8514, (94,) Shoalwater bay, September, 1854. Length, 11.50; extent, 21.50 inches; male.

This hawk I have not found common, and have observed only in the colder months. It has habits and flight much like the preceding, but, of course, preys on smaller birds. Its small size and long tail, besides its greater swiftness of wing, make it easily distinguishable from the pigeon hawk when flying.—C.

The sharp-shinned hawk is quite common near Fort Steilacoom during the latter part of summer and in early autumn. Like the pigeon hawk, they are quite scarce during the breeding season in the more open country about the head of Puget Sound. They appear to descend from the mountains as soon as the young birds are well able to fly, and, in company with many other species of hawk, remain on the prairies for several months before retiring to the south. A few remain throughout the winter.—S.

Sub-Family BUTEONINAE.—The Buzzards.

BUTEO MONTANUS, Nuttall.

The Western Red-tail Hawk.

Buteo montanus, NUTT., Manual I, 112, (1840.)--BAIRD and CASSIN, Gen. Rep. Birds, p. 26.

Falco buteo, (LINN.), AUD. Orn. Biog. IV, 508, pl. 372, oct. ed., p. —, pl. —, (young.)

Buteo Swainsonii, (BONAP.), CASSIN, Birds of Cal. and Tex., I, p. 48.

SP. CH.—Back brown; tail red, with a black band and a white tip; throat and breast dark brown, mixed with white; rest of under parts deep rufous, or abdomen sometimes nearly white.

Female: 22 to 25; wing, 16 to 17; tail, 9 to 10 inches. Male: 19 to 22; wing, 15 to 16; tail, $8\frac{1}{2}$ to 9 inches.

Young: tail ashy brown, with numerous bands of darker shade, and white tip; back mottled with white; underneath numerous large dark spots on all parts.

No. 8534. Yakima river, August 4, 1853. (8) Length, 22; extent, 48 inches. Female?

No. 8535. Shoalwater bay, March 21, 1854. Length, 22; extent, 48 inches. Male.

No. 4521. Santa Clara, Cal., November 10, 1855. Young male. Length, 20.50; extent, 51 inches. Iris hazel; bill bluish gray; feet yellow.

This is an abundant and resident species in every part of the Territory I have visited, and I have no doubt that it builds there; though, as many hawks build only in the thick evergreen forests, it is very difficult to discover their nests. I have observed it also common in California. I have not observed any difference between its habits and those of its eastern congener.—C.

Quite numerous at Puget Sound; scarcer on the Upper Columbia, east of Cascade mountains.

While I was stationed at Fort Steilacoom I noticed that the poultry yards were as much harrassed by this buzzard as by the goshawk, neither of which hesitated to seize poultry from the very doors of dwelling houses. A slight difference is thus noticed in their habits from those of the eastern States, which, according to Nuttall, are not thus bold except in winter. This may be accounted for by the fact that, on Puget Sound, they are more unsophisticated, and that, although hawks as a class are more numerous, small birds to support them are less so in proportion.—S.

BUTEO ELEGANS, Cassin.

Red-bellied Hawk.

Buteo elegans, CASSIN, Proc. Acad. Sc. Phil. VII, 281, (1855.)

BAIRD & CASSIN, Gen. Rep. Birds, p. 28.

Figured in P. R. R. Rep. vol. X. Pl. II, adult; III young plumage.

SP. CH.—Breast nearly brick red, unspotted; rest of under parts with numerous reddish white bars.

Female: length, 20; wing, 13; tail, 9 inches.

Male: length, $18\frac{1}{2}$; wing, $12\frac{1}{2}$; tail, 8 inches.

Young female: every feather beneath with a wide irregular brown band, and sagittate mark at its tip. Back brown, mottled, shoulders more or less rufous. Tail with ten or twelve narrow dark bars and white tip.

Young male: shoulders, under wing coverts, and tibia darker rufous.

No. 4520. Killed at Santa Clara, Cal., October 23, 1855; measured length, 19.50; extent, 41 inches; female.

As most probably belonging to this species, I will here mention a hawk which I saw October 25 at the town of Santa Clara: "I have lately seen a hawk which looks and flies like an owl,

but has the loud scream and high-sailing habit of the winter hawk at midday. Its back is *gray*, breast *reddish*, tail *red*, (?) and in flying it shows a *large dark spot* under the middle of each wing. A pair keep about the town, and often fly up together, circling around and chasing each other in sport. Their wings are remarkably *short and broad*."

The shape of the wing, apparently smaller size, and *rapid* flapping flight, differed from the red-tail's, as I remarked at the time. I tried on several days to get near one, but without success, as it had begun to be shy at the approach of man, whose murderous intentions most of the hawks on that coast had apparently not yet learned.—C.

BUTEO COOPERI, Cassin.

California Hawk.

Buteo Cooperi, CASSIN, Proc. Acad. Philad. VIII, 253, (1856.) BAIRD & CASSIN, Gen. Rep. Birds, p. 31.

"About the size of *Buteo borealis*, but belonging to the same group as *Buteo erythronotus* of South America, (genus *Tachytrorchis*, Kaup, as restricted by Bonaparte, Conspectus Avium, p. 17.)"—CASSIN.

SP. CH.—*Immature plumage*.—Back feathers white at bases, the rest brownish, tinged with *cinereous*; upper tail coverts, *white*, barred with dark brown and rufous; a general *pale* ashy tinge above. Tail, *white* at base, outer webs cinereous, some inner white and mottled rufous on middle feathers; a subterminal band of dark brown, and tip rufous and white. Under parts *white*, with numerous dark stripes on throat, neck, and flanks. A large brownish black spot on under wing coverts.

The adult in full plumage, which has not yet been obtained, probably has the upper parts of a light ash color, (like that of the old marsh hawk,) and the tail white.

No. 8525, Santa Clara, Cal., Nov. 1855. Young female? Length, 20.50; extent, 51 inches. Iris, dark brown; bill, bluish; feet and cere, yellow.

Plate XVI, (Birds,) represents this specimen.

In October and November, 1855, I spent six weeks in Santa Clara county, California, where I met with many new and interesting animals. On November 10, I find it noted in my journal, "Shot a hawk of a kind now quite common here, which keeps about the groves of low oaks, and has much the same cry, habits, and flight, as the red-tail. This specimen appears to be changing its plumage, but has still the *brown* iris, characteristic of young hawks." I saw frequently what I took for the same species up to the time of my departure from California, about December 1. As they were not shy, I might have shot several more, but although new to me, I supposed that the many collectors who had preceded me in California must certainly have obtained numerous specimens of the immature bird, and I tried without success to find more perfect specimens. On the 29th November I observed a pair of them sitting *on the ground* in a perfectly level pairie, at a distance from any covert by which I might approach them. These had the light ashy gray color much more distinct than in the specimen, though I could perceive that they too had some of the mottlings of the immature plumage. They seemed to have nearly white tails.—C.

ARCHIBUTEO LAGOPUS, Gray.

Rough-legged Hawk.

Falco lagopus, GMELIN, Syst. Nat. I, p. 260, (1788.)

WILSON, Am. Orn. IV, pl. XXXIII, fig. 1, young.

AUD. B. of Am. pl. 422, fig. 2, adult?

Archibuteo lagopus, GRAY, Gen. ed. 2, p. 3.

A. lagopus, (GM.) BAIRD & CASSIN, Gen. Rep. Birds, p. 32.

SP. CH.—Head above yellowish, with reddish stripes; back pale cinereous, sometimes very white, with bands of white and dark brown; beneath white, stripes on throat, and large spots and stripes of *brown* on breast; numerous bands of same on abdomen, tibia, and tarsi. Tail coverts and tail at base white; the rest of the tail cinereous, with a broad black band near tip, and two others above it. Blackish spots, and a large ashy brown space on under wing coverts.

Female: length, 21 to 23; wing, 16 to 17; tail, 9 inches.

Male: length, 19 to 21; wing, 15 to 16; tail, 8 to 8½ inches.

Young much more brown; a wide *brownish black band* on abdomen; other under parts *yellowish*, with a few brownish lines and spots. Tail white, with a *light brown band* near tip.

A large hawk, with legs densely feathered to the toes, and which cannot be easily confounded with any other American species. It is distinguished from the young of the black hawk, (*A. Sancti Johannis*), by its smaller size and fewer dark spots on the under parts.—CASSIN.

No. 8549, Shoalwater bay, October 31, 1854, (109.) Length, 21; extent, 52 inches. Iris, pale brown; bill, slate colored and yellow; feet, yellow.

In October, 1854, I found a large number of the rough legged buzzard on a low point near the seacoast, covered with small pines, where they were sitting like owls, on the dead tree tops, occasionally darting down after a mouse, and alighting a short distance off. Sometimes they called to each other with a loud scream, but usually sat for hours motionless and silent. They varied considerably in the amount and distribution of the white feathers, but the specimen shot seemed to be one of the most perfect. One only was of a general dark chocolate color. Some remained all winter, and I think a few build near the mouth of the Columbia, where I saw young birds in July, 1855.—C.

Specimen 6853, (581,) killed at Fort Steilacoom, October 20, 1856, measures: length, $21\frac{1}{2}$; extent, $52\frac{1}{2}$; wing, $16\frac{1}{4}$ inches. Cere and tarsus, yellow; bill, black; iris, greyish yellow.—S.

ARCHIBUTEO FERRUGINEUS, Gray.

Squirrel Hawk.

Buteo ferrugineus, LICHT. Trans. Acad. Berlin, 1838, p. 428.

Archibuteo ferrugineus, GRAY, Gen. p. 3.

A. regalis, GRAY, Gen. I, pl. 6, (plate only.)

A. ferrugineus, (LICHT.,) BAIRD & CASSIN, Gen. Rep. Birds, p. 34.

Buteo californicus, Hutchin's Cal. Magazine, 1857.

Figured in Birds of Cal. and Texas, I, pl. 26.

SP. CH.—Above entirely *dark brown*, and light rufous; tail *reddish white*, mottled with *ashy brown*; pale beneath. Under parts white, with narrow brown streaks and spots on breast, *transverse* and mixed with black on abdomen; flank and axillae bright ferruginous.

Female: length, 23 to 25; wing, 17 to $17\frac{1}{2}$; tail, 9 inches.

Male, smaller. Young: paler, upper tail coverts *white spotted with brown*; fewer streaks below; under wing coverts and edges of wing *white*.—C.

I shot an adult specimen (female) in December, 1854, in the vicinity of Fort Dalles, O. T. It seemed old and feeble, and, either from weakness or apathy, allowed me to approach very closely to its resting place. Its plumage was worn, ragged looking, and appeared as if it had not been changed at the previous moulting season. The tail only of this bird I preserved, as I had a press of material on hand, and much other business to attend to. On showing it to Mr. John Cassin he pronounced it to belong to this species.—S.

Sub-family MILVINAE—The Kites.

ELANUS LEUCURUS, Bonaparte.

The White-tailed Hawk; the Black-shouldered Hawk.

Milvus leucurus, VIEILL. Nouv. Dict. XX, 563, (1818.)

Elanus leucurus, VIEILL, BAIRD and CASSIN, Gen. Rep. Birds, p. 37.

Elanus leucurus, BONAP. Eur. & Am. Birds.

Falco dispar, TEMMINCK, Pl. Col. I, liv. 54, about 1824.

"*Falco melanopterus*, DAUDIN." Bonap. Jour. Acad. Phil. V, 28.

"*Falco dispar*, TEMM." Aud. Orn. Biog. IV, 367.

FIGURES.—Bonap. Am. Orn. II, pl. 11, fig. 1; Temm. Pl. Col. 319; Aud. B. of Am. pl. 352; oct. ed. I, pl. 16, Gay, Nat. Hist. Chili, Orn. pl. 2.

SP. CH.—*Adult*.—Head and tail and entire under parts white. Upper parts fine light cinereous; lesser wing coverts glossy black, which forms a large oblong patch from the shoulder; inferior wing coverts white, with a small black patch. Middle feathers of the tail light ashy, uniform with other upper parts; bill dark; tarsi and toes yellow.

Total length, female, $15\frac{1}{2}$ to 17 inches; wing, 12 inches; tail, $7\frac{1}{2}$ inches. Male smaller.

Hab.—Southern and western States and South America. Spec. in Nat. Mus., Washington, and Mus. Acad., Philadelphia.

No. 5895. Santa Clara, Cal., Oct. 22, 1855. Female, length, $16\frac{1}{2}$; extent, 41; iris, orange red; bill, black; feet, orange; wing, 12; tail, $7\frac{1}{2}$ inches.

I found this beautiful little hawk quite abundant during my visit to California, and almost always to be seen hovering over the meadows in search of field mice, which seem to be its principal food. This specimen had the remains of one in its stomach. Though this hawk may visit the prairie regions of southern and middle Oregon, I never saw or heard of it near the Columbia river.—C.

CIRCUS HUDSONIUS, Vieillot.

The Harrier; the Marsh Hawk.

Falco hudsonius, LINN. Syst. Nat. I, 128, (1766.)

Circus hudsonius, VIEILL. Ois. Am. Sept. pl. 9.

Circus hudsonius, LINN, BAIRD & CASSIN, Gen. Rept. Birds, p. 38.

"*Falco uliginosus*," GM. Syst. Nat. I, 278, (1788.)

"*Falco uliginosus*," WILSON, Am. Orn. VI, 67.

"*Falco cyaneus*," AUDUBON, Orn. Biog. IV, 396.

FIGURES.—Vieill. Ois. d'Am. Sept. pl. 9; Wilson Am. Orn. VI, pl. 51, fig. 2; Bonap. Am. Orn. II, pl. 12; Aud. B. of Am. pl. 356; oct. ed. I, pl. 26; Sw. & Rich. Faun. Bor. Am. Birds, pl. 29.

SP. CH.—Upper parts, head and breast, pale *bluish ash color*, mixed with *rufous* on back; upper tail coverts *white*. Beneath white with small *cordate ferruginous* spots; quills *brownish black*, externally ashy, inner web partly white; tail light ashy; feathers nearly white on inner webs, with obscure brown bars; below white; under wing coverts unspotted.

Female: length, 19 to 21; wing, $15\frac{1}{2}$; tail, 10 inches.

Male: length, 16 to 18; wing, $14\frac{1}{2}$; tail, $8\frac{1}{2}$ to 9 inches.

Young: above *brown*, variegated with *rufous*; upper tail coverts brown or white; tail reddish, *with or without* about three wide fulvous bands. Beneath rufous or nearly white, with brown stripes.

No. 8780, (156.) North fork of the Platte R., Neb., Aug. 17, 1857. Young—length, 21; extent, 47; wing, 15 inches; iris brown, bill black, feet yellow.

No. 8236, (218.) Forks of the Platte R., Oct. 17, 1857. Old male in full plumage—length, 18.50; extent, 42.50; wing, 13.50 inches. Iris and cere yellow, bill slate color, feet brown and yellow.

This hawk is easily distinguishable, even at a distance, by its large size, long wings and tail, small round head, and long legs. It is also the only kind commonly seen in the northern States sailing slowly over meadows and prairies, generally alighting on the ground, (where it also builds its nest.) It is commonly of a dark brown color, but old birds (after several years) become of a fine ash color above and white beneath, beautifully marked with bars and spots. This state of plumage is rarely seen, and younger birds are often found with nests and young.

The marsh hawk is abundant throughout the open districts of the Territory, especially in winter, and it builds there. I never saw but two specimens among hundreds, having the light blue color distinctive of the adult male. I found it no less common in California.

In a journey to Fort Laramie, Nebraska, I found this bird no less numerous from July to November, and noticed the curious fact that at least half of them were of the blue plumage. From this I infer that the older birds seek the far interior in preference to the seaboard, either from acquired experience of its greater safety, or for some other advantage which they find

there. The old birds of some other kinds are said to have the same habit of resorting to the interior, particularly during their periodical migrations.

This hawk feeds chiefly on mice and small birds, rarely disturbing the farmer's poultry, and is, doubtless, of much more benefit to him than injury.—C.

The marsh hawk, or hen harrier, I have found a frequent inhabitant of the neighborhood of all Oregon streams, being not only, as mentioned by Nuttall, found there in winter, but is also a constant summer resident. I procured one specimen, a male in the adult bluish-gray plumage, at Fort Dalles in the spring of 1855. Although I had constantly seen these birds during the two previous years of my residence in Oregon, I had never before met with it in its gray plumage, all that I had seen being in the immature state, and while flying showing a very conspicuous white patch upon the rump. Many specimens in the latter stage of plumage I saw in the summer of 1856 at Fort Steilacoom. Specimen 5851 (551) measured, length 21, extent 47 inches.—S.

Sub-Family AQUILINAE.—The Eagles.

HALIAETUS LEUCOCEPHALUS, Savigny.

The Bald Eagle; the White-headed Eagle.

Falco leucocephalus, LINN. Syst. Nat. I, 124, (1766.)

Falco pygargus, DAUDIN, Traite d'Orn, II, 62, (1800.)

Falco ossifragus, WILSON, Am. Orn. VII, 16, (1813.)

Haliaetus leucocephalus, SAVIG. Cuv. Reg. An. ed. 2, p. 326.

Haliaetus leucocephalus, (LINN.) BAIRD & CASSIN, Gen. Rep. Birds, p. 43.

FIGURES.—Catesby's Carolina I, pl. I; Vieill. Ois. O'Am. Sept. I, pl. 3; Wilson Am. Orn. IV, pl. 36, VII, pl. 55; Aud. B. of Am., pl. 31, 126; oct. ed. I, pl. 14.

SP. CH.—Head, tail, and its coverts white; rest of plumage brownish black, edges of feathers paler.

Female: length, 35 to 42½; wing, 23 to 25; tail, 14 to 15 inches. Extent about 88 inches. Male: 30 to 34; wing, 20 to 22, tail 13 to 14 inches.

Young: entire plumage dark brown, paler on throat and edges of feathers; tail more or less mottled with white. Attains the adult plumage in four years.

This well known bird scarcely needs a special description here, although it seems probable that a larger species of similar plumage may be found in countries inhabited by this also.

(See Gen. Rep. on *H. Washingtonii*.)

No. 9130, (53,) Shoalwater bay, February 27, 1854; young female: length 37, extent 87.50. Iris brown.

No. 52 (lost) Vancouver, February 18, 1854; adult male: length 33, extent 79. Iris, bill, and feet yellow.

The white-headed eagle is one of the most abundant of the falcon tribe in Washington Territory, particularly along the Columbia river, and other smaller streams, as well as the salt water. I was astonished at their numbers on the day of my arrival in the Territory in June, 1853. As the steamer ascended the Columbia river, a light rain falling constantly, I could see three or four at any time, sitting on the gigantic spruces that lined the banks, occasionally sailing off, circling around overhead, uttering their shrill scream, as if to dispute our right to navigate the great river. Though their white head and tail made them clearly visible against the dark green background of foliage, they sat often so high above the river as to look no larger than crows, and their screams were only faintly audible. Excepting a few sea-ducks and gulls at the mouth of the river, the eagles were the only birds I saw that day, and the absence of fish-hawks, crows, &c., struck me as remarkable.

This eagle is a constant resident, and, I believe, lays its eggs as early as February, though I never examined a nest at that season. I never saw it dive for fish or pursue unwounded birds, but have seen it settle for a moment on the water to secure a dead fish, closing its wings. It is a great pest to the sportsman, being always on the lookout for wounded birds, which it seizes almost from his grasp. It will sometimes sit for hours on the beach among gulls, crows, and ravens, which are quite unconcerned at its presence.

The young of this species seems to prefer the seacoast, and is generally supposed to be another species by the name of "grey eagle." It seems to differ in the greater breadth of the wings and tail, which, however, depends on the form of the feathers only. The coloring is very variable, not only the head and tail, but the back and breast being mottled, and sometimes entirely white. These varieties might easily be mistaken for species before the regular change of plumage was fully demonstrated. During the journey northward to the 49th degree, I saw numbers of eagles along the Columbia, commonly sitting on some log or cliff over the water. In Santa Clara county, California, I saw a nest of this bird large enough to fill a wagon. It was built in a large sycamore tree, standing alone in the prairie, and but a short distance from several farm houses. On my shooting a magpie from the tree, one of the eagles came from a distance and flew round to reconnoitre, though, as it was November, they probably had no eggs or young in it. The farmers not having molested it, I suppose the eagles were not troublesome, and probably found enough to eat among the great numbers of cattle dying on those plains.

I have never seen this eagle about the high mountain tops, and on the plains east of the Rocky mountains it is a rare visitor.—C.

This noble looking bird is exceedingly abundant in Oregon and Washington Territories, and in certain localities, especially during the salmon season, may be found in great numbers. De Smet, in his work on "Oregon Missions," speaks of their abundance about the shores of several of the large lakes on the upper Columbia, where they find, during certain months of the year, an easy subsistence, owing to the vast numbers of dead and dying salmon which line the water margin. While crossing the continent with Governor Stevens' party in 1853 I succeeded in obtaining a pair of young birds alive, from an eyrie built in a tree on the borders of Lake Jessie, Minnesota. They were forwarded to the Smithsonian Inst'n, and deposited in the collection of living creatures kept for the amusement of the patients at the lunatic asylum near Washington city. On my canoe voyage from the Rocky mountains to Fort Vancouver, I frequently passed these birds, at times sitting alone, or in pairs, in the trees over the river banks, or perched on the high cliffs overhanging the wild streams of the mountains. They appeared quite tame and frequently permitted an approach within easy rifle shot. Sometimes one or two might be seen in company with a few little impudent looking crows, dividing the remains of a dead and putrid salmon which had been washed up on the shores of the Columbia. These dead salmon appear to afford the principal nourishment to the eagles, crows, and coyotes of that region.

Mr. Geo. Gibbs says that he has seen the present bird alight in deep water, and rest upon it like a gull.

The measurements of the Oregon specimens seem to be greater than those of the Atlantic. I think that this bird, in Oregon, does not depend much on the prey captured from the osprey, as the latter bird is not at all abundant there, but rather, as above stated, on the dead bodies of fish which are cast up on the shores of the coast, bays, and rivers, becoming thus vulture-

like in its habits—a truly mortifying character to be assumed by the representative of our national emblem.

The eyries of this bird are frequently found throughout Oregon, and are bred in, during successive seasons, year after year, as stated by various authors.

At times the settlers speak of seeing very large eagles—larger, they say, than the bald eagle. Perhaps these may be specimens of the *pelagicus* or *Washingtonii*. I have not yet been lucky enough to secure a specimen of either.

Captain Burns, of Port Discovery, (Puget Sound,) informed me that in the spring of 1856 he caught a young bird of this species, which he called, in common with the other settlers, a “gray eagle.” This was reared as a pet, and became quite tame. At times the captain would take the young eagle on coasting voyages along Puget Sound. The bird would frequently leave the vessel on short excursions, generally, however, returning to it again, even when the schooner in sailing had altered its position several miles, and being never deceived so as to fly on board of other small craft, although many would be near by. Sometimes, however, the eagle would prefer returning to Captain B.’s house, on the bay of Port Discovery. At the time I was informed of this the bird had lived with the captain nearly a year, and manifested no desire to seek another home. About the house he was quite a terror to the pigs and small dogs, from which he remorselessly took any carrion or other delicacy which suited his palate.—S.

PANDION CAROLINENSIS, Bonaparte.

The Fish Hawk; The American Osprey.

Falco carolinensis, GM. Syst. Nat. I, 263, (1788.)

Aquila piscatrix, VIEILL. Ois. d’Am. Sept. I, 29, (1807.)

Pandion americanus, VIEILL. Gal. Ois. I, 33, (1825.)

Falco haliaetus, LINN. WILSON, Am. Orn. V. 14.

Falco haliaetus, LINN. AUD. Orn. Biog. I, 415.

Pandion carolinensis, BONAP. Eur. and Am. Birds, p. 3.

Pandion carolinensis, (GM.) BAIRD & CASSIN, Gen. Rep. Birds, p. 44.

FIGURES.—Catesby’s Carolina, I, pl. 2; Vieill. Ois. d’Am. Sept. I, pl. 4; Wilson, Am. Orn. V, 37; Aud. B. of Am. pl. 81: oct. ed. I, pl. 15; Nat. Hist. New York, Birds, pl. 8, fig. 18.

SP. CH.—Head and entire under parts white; stripe through the eye, top of head, and upper parts, deep brown; tail with about eight bands of blackish-brown; breast with numerous cordate and circular pale brownish spots.

Female: length, about 25; wing, 21; tail, 10½ inches.

Male: length, 22½–23; wing, 19½; tail, 10 inches.

Young: above with pale tips to feathers; more numerous and darker spots on breast.

The fish hawk is common along the coast, arriving at Puget Sound by the middle of April, and building on dead trees near there and near the mouth of the Columbia river. I never saw them on the upper part of that river, though they probably ascend with the fall salmon. I did not see the eagle rob this hawk, though abundant in the same places. The reason may be that it can obtain plenty of food more honestly and with less trouble in that country. This hawk never troubles the farmers, and is generally unmolested, except by idlers and naturalists.—C.

A specimen of the osprey was shot, at Steilacoom, by Mr. George Gibbs, and presented to me. I have seen it also in the Rocky mountains. No. 5837 (531) Fort Steilacoom, October 2, 1856; length, 22½; extent, 62½; wing, 19½ inches.—S.

Family STRIGIDAE.—Owls.

Sub-family BUBONINAE.—Horned Owls.

BUBO VIRGINIANUS, Bonaparte.

Great Horned Owl.

Strix virginiana, GM. Syst. Nat. I, p. 287, (1788.)

S. magellanicus, GM. Syst. Nat. I. p. 286, (1788 ?)

Bubo virginianus, BONAP. Comp. List, p. 6.

B. virginianus, (GM.) BAIRD & CASSIN, Gen. Rep. Birds, p. 9.

B. arcticus, SWAIN. F. B. Am. Birds, p. 86, (1831.)

B. subarcticus, HOY, Proc. Acad. Sc. Philad. VI, 212.

FIGURES.—Wilson, Am. Orn. VII, pl. 50, fig. 1; Aud. B. of Am. pl. 61: oct. ed. I, pl. 39; Nat. Hist. New York, pl. 10, fig. 22; Fauna Bor. Am. Birds, pl. 30.

SP. CH.—Very large; ear tufts long, erectile; color varying from nearly white to dark brown; above darkest, and mottled irregularly with transverse lines of pale ashy and reddish. Throat and neck white, breast with dark stripes other parts somewhat fulvous, mixed with brown and white.

Female: length, 21 to 25; wing, $14\frac{1}{2}$ to 16; tail, 10 inches.

Male: length, 18 to 20; wing, 14 to 15; tail, 9 inches.

The largest horned or tufted owl in America, varying in size, though the smallest males are over eighteen inches long, and their wing fourteen inches. Usually dark-colored, and (*var. pacificus*) with an ash-colored face, while others (*var. atlanticus*) have it fulvous. The pale variety (*arcticus*) is sometimes nearly white, but more commonly yellowish. All of these forms are found in the Territory.

No. 9159 (—) Okanagan R., Sept. 27, 1853. Length, 27; extent, 52 inches, (*var. pacificus*.)

The great horned owl is a common and constant resident in all parts of the Territory I have visited, but principally among dark forests, where it sits dozing through the day, unless discovered by some crow or other bird, when its chance for rest is gone, until the shades of night disperse its persecutors, and give it an opportunity of taking ample revenge.—C.

The great horned owl is very abundant about Puget Sound. I obtained fully half a dozen skins, all resembling in character the description given by Cassin of the variety *pacificus*. The aborigines near Fort Steilacoom, when they hear one of these birds uttering his deep, hooting sounds near their lodges at night, are much alarmed. As usual, they consider that it is a warning of the approach of death, or some other great calamity—thus showing another instance of the almost universal, superstitious dread, which, in various parts of the world, is inspired by birds of this family.

In July, 1856, I obtained two individuals alive, which, although fed and kindly treated for several months, abated not a whit their original ferocity. At the approach of any one—even their habitual feeder—they instantly manifested vindictiveness, rage, hatred, and defiance, and kept up a hissing noise, interrupted by loud snapping sounds, produced by “gnashing” their bills.

While in the Rocky mountains I found owls quite plentiful, and at night heard frequently the hooting of individuals of some large species, which, although kept up at about the same intervals as those produced by the present kind, were much more feeble.—S.

SCOPS ASIO, Bonaparte.

The Mottled Owl; the Screech Owl.

Strix asio, LINN. Syst. Nat. I, p. 132, (1766.)

Strix naevia, GM. Syst. Nat. I, p. 289, (1788.)

Scops asio, BONAP. Eur. and N. Am. Birds, p. 6.

Scops asio, (LINN.) BAIRD & CASSIN, Gen. Rep. Birds, p. 57.

FIGURES.—Catesby's Nat. Hist. Carolina I, pl. 7; Vieill. Ois. d'Am. Sept. I, pl. 21; Temm. pl. col. 80; Wilson, Am. Orn. pl. 19, fig. 1, pl. 42, fig. 1; Aud. B. of Am. pl. 97: oct. ed. I, pl. 40; Nat. Hist. New York, Birds, pl. 12, figs. 25, 26.

SP. CH.—A small tufted owl. In adult the upper parts *ashy brown*, with streakings and mottlings of brownish black and of cinereous. Below *ashy white*, striped with *black* and barred with *narrow black* lines; tail with about *ten* narrow cinereous bands.

Younger: nearly all upper parts pale brownish red, paler and white below; tail rufous, with brown bands.

Young: entirely barred with *ashy white* and *pale brown*; wings and tail *pale rufous*.

Length, in both sexes, $9\frac{1}{2}$ to 10; wing, 7; tail, $3\frac{1}{2}$ inches.

A specimen of this owl, in the mottled plumage, was obtained by me at Fort Vancouver, W. T.—S.

OTUS WILSONIANUS, Lesson.

The Long-eared Owl.

Otus Wilsonianus, LESSON, Traite d'Orn. I, p. 110, (1831.)

BAIRD and CASSIN, Gen. Rep. Birds, p. 53.

Otus Americanus, BONAP. Comp. List, p. 7, (1838.)

Strix Americana, GM. Syst. Nat. I, p. 288, (1788?)

Strix perigrinator, BARTRAM, Travels, p. 289, (1790?)

FIGURES.—Wilson, Am. Orn. VI, pl. 51, fig. 1; Aud. B. of Am., pl. 383: oct. ed. I, pl. 37; Nat. Hist. New York, Birds, pl. 11, fig. 24.

SP. CH.—Ear tufts long, above mottled, a *brownish black* hue predominating, mixed with *ashy*; breast pale *fulvous*, with dark *stripes* and narrow *bars*; eye nearly encircled with *black*; rest of face *ashy*; tail *brown*, with several irregular bands of *ashy fulvous*, and mottled.

Female: Length, 15; wing, 11 to $12\frac{1}{2}$; tail, 6 inches. *Male* rather smaller.

No. 9143, (19,) John Day's river, Oregon Territory, November 12, 1853. Length, 14.50; extent, 38. *Female*.

No. 8,243, (225,) 100 miles east of Fort Kearney, Nebraska, October 28, 1857. Length, 14.50; extent, 37.50; wing, 12. Iris, yellow; bill, bluish; toes, gray.

The long-eared owl I only obtained once, on the banks of the Columbia, east of the Dalles, November, 1853. In the same desolate and barren region, where the only trees are a few small willows along the banks of the river, several species of owls are found, which, apparently, have deserted their favorite forests for the sake of the hares and mice abounding in some parts of this region. The willows scarcely diminish the brightness of the sunlight, which strikes down on them from morning to night.—C.

I obtained a bird of this species in a dense thicket, on a small branch of Milk river, Nebraska. I suppose that, owing to the scarcity of hollow trees in that vicinity, the umbrageous shelter of thick brush is used as a substitute. The owl appeared stupid and sleepy, and allowed a very near approach.—S.

BRACHYOTUS CASSINII, Brewer.

The Short-eared Owl.

Brachyotus Cassinii, BREWER, Proc. Boston Soc. N. H. BAIRD and CASSIN, Gen. Rep. Birds, p. 54.

Strix brachyotus, FORSTER, Phil. Trans. London, LXII, p. 384, (1772.)

Brachyotus palustris americanus, BONAP. Consp. Av. p. 51, (1849.)

FIGURES.—WILSON, Am. Orn. IV, pl. 33, fig. 3; Aud. B. of Am. pl. 410: oct. ed. I, pl. 38; Nat. Hist. New York, Birds, pl. 12, fig. 27.

SP. CH.—About the size of the last, but easily distinguished by its very short ear tufts, (nearly concealed by the feathers,) and by its buff or pale fulvous color. No. —, (17,) Spokane Plain, October 30, 1853; male. Length, 15.50; extent, 38; iris, cere, and toes yellow. No. 8791, (164,) North Fork, Platte river, Nebraska, August 20, 1857. Length, 14; extent 41.50; wing, 12 inches.

I first met with the marsh owl on the Great Spokane Plain, where, as in other places, it was commonly found in the long grass during the day. In fall and winter it appears in large numbers on the low prairies of the coast, though not gregarious. On cloudy days it sometimes hunts, flying low over the meadows, like the marsh hawk, but is, properly, nocturnal. This owl is not often persecuted by small birds, though it no doubt often makes a meal of them. I have not observed it during summer in the Territory.—C.

A bird, apparently the short-eared owl, was seen by me in November, 1858, on a marsh near a small lake, about three miles below Fort Dalles.—S.

Sub-Family SYRNINAE.—The Gray Owls.

SYRNIUM CINEREUM, Audubon.

The Great Gray Owl.

Strix cinerea, GM. Syst. Nat. I, p. 291, (1788.)

Strix acclamator, BARTRAM, Travels, p. 289, (1790.)

Syrnium cinereum, AUD. Synop. N. A. Birds, p. 26.

Syrnium cinereum, (GM.) BAIRD & CASSIN, Gen. Rep. Birds, p. 56.

FIGURES.—Fauna Bor. Am. pl. 31; Aud. B. of Am. pl. 351: oct. ed. I, pl. 35; Nat. Hist. New York, Birds, pl. 13, fig. 29.

SP. CH.—The largest owl of North America, and not easily to be mistaken for any other, being untufted, and of a nearly uniform dark gray color, mottled and barred with ashy white. No. 9138 (80,) Shoalwater bay, June 16, 1854. Length, 25; extent, 56 inches; iris, yellow. Female.

The *great cinereous owl* I found common only in one locality near the mouth of the Columbia river. They frequented a brackish meadow, partially covered with small spruce trees, in which they sat concealed during the day, and frequently made short flights from one to another. Though there were many jays and other birds about, they did not attack these owls, as they would certainly have done with the horned owl. The specimen having been shot in June, I have no doubt that some of these owls are constant residents and build near that locality.—C.

NYCTALE ACADICA, Bonaparte.

Saw-whet Owl.

Strix acadica, GM. Syst. Nat. I, p. 296, (1788.)

Strix acadensis, LATH. Ind. Orn. I, pl. 65, (1790.)

"*Strix passerina*, LINN." Wilson, Am. Orn. IV, p. 66.

Nyctale acadica, BONAP. Eur. & N. Am. Birds, pl. 7.

Nyctale acadica, (GM.) CASSIN, Gen. Rep. Birds, p. 58.

FIGURES.—Lath. Gen. Syn. I, pl. 5, fig. 2; Wilson, Am. Orn. IV, pl. 34, fig. 1; Aud. B. of Am. pl. 199; oct. ed. I, pl. 33; Nat. Hist. New York, Birds, pl. 11, fig. 23.

Small, wings long, tail short. Upper parts reddish brown, tinged with olive; head in front with fine lines of white, and on the neck behind, rump, and scapulars, with large partially concealed spots of white. Face ashy white; throat white; under parts ashy white, with longitudinal stripes of pale reddish brown; under coverts of wings and tail white. Quills brown,

with small spots of white on their outer edges, and large spots of the same on their inner webs; tail brown, every feather with about three pairs of spots of white; bill and claws dark; irides yellow.

Total length about $7\frac{1}{2}$ to 8 inches; wing, $5\frac{1}{2}$ inches; tail, $2\frac{3}{4}$ to 3 inches; sexes nearly the same size and alike in colors.

Easily distinguished from the other little owls without ear tufts by the few white spots on its tail feathers, (about three pairs on each.) It is the smallest owl of the eastern States, but larger than one other western species.

At Vancouver, February 3, 1854, I found one dead and lying on a log in the woods. I could find no cause for its death, unless it was from starvation, it being extremely emaciated and its stomach empty. The weather being the coldest known there for many years, and the ground covered with snow, there were not many birds about, and mice must have been difficult to obtain.—C.

A fine specimen of this little owl I obtained at the Dalles of the Columbia, on the north side, in December, 1853. It was several miles from the timbered region, and I suppose lived in the basaltic cliffs of the vicinity.—S.

Sub-Family ATHENINAE.—The Bird Owls.

ATHENE HYPUGÆA, Bonaparte.

The Burrowing Owl.

Strix cunicularia, BONAP. Am. Orn. I, p. 68, (*hypugæa*, in a note on p. 72,) (1825.)

Athene socialis, GAMBEL, Proc. Acad. Philada. III, p. 47, (1846.)

Athene hypugæa, BONAP. Consp. An. p. 39.

Athene hypugæa, (BONAP.) BAIRD & CASSIN, Gen. Rep. Birds, p. 59.

FIGURES.—Bonap. Am. Orn. I, pl. 7, fig. 2; Aud. B. of Am. pl. 432, fig. 1: oct. ed. I, p. 31, (upper figure.)

SP. CH.—Above light ashy brown, with numerous partly-concealed white spots. Throat white; a collar of dark brown and white below this; then a large white patch; lower parts pale brown or yellow; quills much spotted; tail with five or six bands of yellowish white.

Varying in general tint from very pale to light reddish brown; the pale plumage very common, and having a faded appearance.

No. 8767, (140,) 35 miles west of Fort Kearney, August 3, 1857. Length, 9; extent, 23.50; wing, 6 inches. Iris, bright yellow; bill, grayish.

This specimen is from the most eastern locality where this bird has been observed. I saw it there in great numbers on the plains of Nebraska, and did not observe any difference in habits between this and the bird of California.—C.

I shot a specimen of this owl at the mouth of a "prairie dog's" hole, near Fort Benton, Nebraska.—S.

ATHENE CUNICULARIA, Bonaparte.

Western Burrowing Owl.

Strix cunicularia, MOLINA, Sagg. Stor. Nat. Chili, (1782.)

Strix californica, AUD. B. of Am. pl. 432, fig. 2, (name on plate.)

Athene palagonica, PEALE, Zool. U. S. Ex. Exp. Vincennes, Birds, p. 78, (1848.)

Athene cunicularia, BONAP. Eur. and N. Am. Birds, p. 6.

Athene cunicularia, (MOL.,) BAIRD & CASSIN, Gen. Rep. Birds, p. 60.

FIGURES.—Aud. B. of Am. pl. 432, fig. 2: oct. ed. I, pl. 31, (lower figure.)

SP. CH.—Distinguished from the burrowing owl of the plains east of the Rocky mountains chiefly by its larger size, more full feathering of the tarsus, and longer legs.

No. 5896, Santa Clara, Cal., November 5, 1855.

No. 5897, Santa Clara, Cal., November 5, 1855. Length, 9.50 inches; extent, 25. Iris, yellow; bill, horn color; toes, gray.

Although obtained by Dr. Suckley at Fort Dalles, I met with none of them in the plains north of the Columbia river. There is little doubt, however, of their being found there earlier in summer than I visited that part of the Territory.

In California this owl lives in the vacant burrows of the California "ground squirrel," (*Spermophilus Beecheyi*.) I never saw or heard of any burrowing animal as large as this north of the Columbia, except the badger.—C.

Specimens of this bird I obtained at Fort Dalles. As there are no prairie dogs at Fort Dalles, and but few burrowing animals except the *Spermophilus Douglassii*, or prairie squirrel, whose burrows are too small for the entrance of this bird, I am inclined to think that their abodes in that vicinity are more among the fissures and cracks of the basaltic rock, so abundant there, rather than in the soft earth. As to the habits of this bird in Oregon I can say nothing, as the specimens I obtained were killed by others. Abundant at the Dalles and probably throughout the timberless interior of both Oregon and Washington, but not seen by me west of the Cascade mountains.—S.

GLAUCIDIUM GNOMA, Wagler.

The Pigmy Owl.

Glaucidium gnoma, WAGLER, Isis, XXV, p. 275, (1832.)—BAIRD & CASSIN, Gen. Rep. Birds, p. 62.

"*Strix passerinoides*, TEMM." AUD. Orn. Biog. V, p. 271, pl. 432, figs. 4, 5: octavo edition, I, pl. 30.

"*Strix infusata*, TEMM." CASSIN, B. of Cal. & Texas, I, p. 189.

Glaucidium californicum, SCLATER, Proc. Zool. Soc. London, 1857, p. 4.

SP. CH.—The smallest of North American owls, and well marked by its dark brown back, dotted with small round spots of dull white. Female largest, and with rather larger spots.

No. 9162, Shoalwater bay, November 1, 1854. Female: length, 7.50; extent, 14 inches. Iris yellow; bill and feet pale yellow, the former slightly tinged with green.

This (the smallest owl found in the Territory) I have only seen once, though it seems to be not very uncommon. On the first of November, 1854, I observed it among a flock of sparrows, which did not seem at all frightened by its presence. For some time I thought it was one of them, though its large head and owl-like flight seemed to me strange. It was plainly diurnal in habits, not seeming to seek any shelter from the sunshine. Its stomach contained only insects, and it is probable that it does not often attack birds.—C.

I have obtained two specimens of this owl at Puget Sound, where it seems to be moderately abundant. It appears to be diurnal in its habits, gliding about in shady situations in pursuit of its prey. I saw a bird of this kind, about mid-day, in a shady alder swamp near Nisqually. It flitted noiselessly past me several times, alighting near by, on a low branch, as if to examine the intruder. It seemed quite tame and entirely unsophisticated. As I was hunting deer at the time I refrained, reluctantly, from shooting it. I noticed that, in flying, the tail was kept rather widely spread. Near a small lake, in the neighborhood of Fort Steilacoom, I frequently heard the voice of a small owl, the notes of which were subdued and clear, like the low, soft notes of a flute. As the only *small* owl which I ever saw in the neighborhood belonged to this species, it is probable that the sounds I heard emanated from an individual of the kind.—S.

Family PICIDAE.—The Woodpeckers.

PICUS HARRISII, Aud.

Harris' Woodpecker.

Picus harrisii, AUD. Orn. Biog. V, 1839, 191; pl. 417.—IB. Syn. 1839, 178.—IB. Birds America, IV, 1842, 242; pl. 261, (dark-bellied variety.)—NUTTALL, Man. I, 2d ed. 1840, 627.—BAIRD, Gen. Rep. Birds, p. 87.

? *Picus inornatus*, LICHT. (Bon. Consp.)

Picus (Trichopicus) harrisii, BP. Consp. Zyg. Aten. Ital. 1854, 8.

SP. CH.—Above black, a white stripe down the back. The only white spots on the surface of the folded wings are seen on the outer webs of the primaries and outer secondaries, (none on tertials.) Beneath whitish, with faint streaks on the side of the body. Two white and two black stripes on each side of the head; the latter confluent with the black of the neck, the upper white stripe nearly confluent. Three outer tail feathers with the exposed portions white. Length, 9.75 inches; extent, 16 inches; wing, 5 inches. Male, with a nuchal scarlet crest covering the white of the back of the head.

Size and general appearance that of the hairy woodpecker, *Picus villosus*. Iris, hazel; feet, gray.

Hab.—From the Pacific coast to the eastern slope of the Rocky mountains.

Harris' woodpecker is the most abundant species in the Territory, being found on both sides of the Cascade mountains, frequenting the lower parts of the great coniferous trees. It is a constant resident, and in May burrows out a nest in a dead tree sometimes only four feet from the ground. In cries and habits it is so exactly like the larger "sapsucker" of the Atlantic States, that were there not constant and unchangeable differences in plumage it would be taken for the same species.—C.

Quite abundant. Obtained at Fort Dalles, where it is found among the true *pin*es, and at Fort Steilacom, among the *firs*, (*A. Douglassii*.) It is a winter resident in both localities.—S.

PICUS GAIRDNERI, Aud.

Gairdner's Woodpecker.

Picus gairdneri, AUD. Orn. Biog. V, 1839, 317.—IB. Syn. 1839, 180.—IB. Birds Amer. IV, 1842, 252, (not figured.)—BAIRD, Gen. Rep. Birds, p. 91.

Picus meridionalis, NUTT. Man. I, 2d ed., 1840, 690, (not of Swainson.)

SP. CH.—Very similar in size and color to *P. pubescens*; darker. Larger wing coverts, and more exposed tertials, either pure black, or with but occasional spots on the outer web in the latter. Black with a white median stripe. Side of head with two white and two black stripes. Two outer tail feathers white, with two bands of black at the end. Male with a scarlet occipital band. Length, 6¾ inches; extent, 11½; wing, 3¾, generally rather less. Iris, reddish brown; feet, bluish black; bill, gray.

Hab.—With *P. harrisii*, from Pacific coast to eastern base of Rocky mountains.

The remarks applied to Harris' can be also used respecting the close affinity of "Gairdner's woodpecker" to its eastern analogue, commonly known as the *little* sapsucker, and to naturalists as the "downy woodpecker," to distinguish it from the larger species, which is rather inappropriately called the "hairy woodpecker." This little bird seems purposely adapted for the business of ridding the smaller forest trees of the insects which infest their bark, as its larger relative is for its constant labor at the bark of the larger trees. "Gairdner's" woodpecker is always found among the oaks, maples, and alders, industriously pecking the bark at all hours of the day, occasionally uttering its shrill cry as it flies from one to another. In habits, flight, and cries, it is a perfect miniature of the preceding, besides resembling so closely the small

eastern species. The only difference appears to be in slight but constant distinctions of plumage. I observed both of these species in California, where they were quite common. In the absence of the larger coniferæ, Harris' woodpeckers frequented the oaks, &c., as it occasionally does in the north.—C.

Extremely common on the lower Columbia, especially among the willow trees lining its banks. They are winter residents, and in these situations very abundant. In January, 1856, I found them so abundant among the willows growing on the islands in the delta of the Willamette, that I readily obtained eight in the space of an hour. At this season they are very unwary, giving very little heed to the presence of man; scarcely allowing the near discharge of a gun to interfere with their busy search for food.—S.

PICUS ALBOLARVATUS.

White-headed Woodpecker.

Leuconerpes albolarvatus, CASSIN, Pr. A. N. Sc. V, Oct. 1850, 106. California.

Melanerpes albolarvatus, CASSIN, Jour. A. N. Sc. 2d series, II, Jan. 1853, 257; pl. 22.—NEWBERRY, Zool. Cal. and Oreg. Route, 9, Rep. P. R. R. VI, 1857.

Leuconerpes albolarvatus, BONAP. Consp. Zyg. At. Ital. 1854, 10.

Picus (Xenopicus) albolarvatus, BAIRD, Gen. Rep. Birds, p. 96.

SP. CH.—Fourth and fifth quills equal and longest. Entirely bluish black, excepting the head and outer edges, with the entire basal portion, of the primaries, which are white. Male with a narrow line of red on the nape.

Length about 9 inches; extent, 16 inches; wing, 5½. Iris brown.

Hab.—Cascade mountains of Oregon and southward into California.

The white-headed woodpecker I have only met with once. This was in a pine grove near the Spokane river, October 28, 1853. It was in company with Harris' woodpecker, and several species of titmice, nuthatches, &c. In habits it seemed closely to resemble the other small woodpeckers. The country east of the Cascade mountains, resembling in many parts the dry, open forests of California, seems to be suited to the habits of many species of birds, which, in migrating north, shun the dark, damp forests of the lower Columbia. Several instances of this fact occurred to me besides the present.—C.

SPHYROPICUS RUBER, Baird.

Red-breasted Woodpecker.

Picus ruber, GM. Syst. Nat. I, 1788, 429.—WAGLER, Syst. Av. 1827, No. 151.—AUD. Orn. Biog. V, 1839, 179; pl. 416.—IB. Birds Amer. IV, 1842, 261; pl. 266.

Melanerpes ruber, RICH. List, Pr. Br. Assoc. for 1835.—BONAP. List. 1838.—IB. Consp. 1850, 115.

Pilumnus ruber, BON. Consp. Zyg. Aten. Ital. 1854, 8.

Picus flaviventris, VIEILLIOT, Ois. Am. Sept. II, 1807, 67.

Sphyrapicus ruber, BAIRD, Gen. Rep. Birds, 104.

SP. CH.—Fourth quill longest; third intermediate between fourth and fifth. Bill brown wax color. Head and neck all round and breast carmine red. Above black, central line of back from nape to rump spotted with whitish; rump, wing coverts, and inner web of the inner tail feathers white, the latter with a series of round black spots. Belly sulphur yellow, streaked with brown on the sides. Narrow space around and a little in front of the eye black. A narrow yellowish stripe from the nostrils, a short distance below and behind the eye. Length, about 9.50 inches; extent, 15.75; wing, 5 inches; tail, 3.40 inches. Iris in bill and feet pale brown.

Hab.—Pacific slope of the United States.

The crimson-headed woodpecker, though it is colored somewhat like the red-head of the Atlantic States, can scarcely be considered analogous to it, as it appears to differ much in habits.

I have only met with them three times, in spring and fall, when they were very shy, silent, and retiring, remaining among the dense tops of the dark forest trees. Whether it resides and breeds in the Territory I have had no chance of observing.—C.

I have seen but one specimen of this species. It is, probably, for the most part, confined to the close vicinity of the coast.—S.

HYLATOMUS PILEATUS, Baird.

Black Wood Cock; Log Cock.

Picus pileatus, LINN. Sys. Nat. I, 1766, 173.—VIELLIOT, Ois. Am. Sept. II, 1807, 58; pl. cx.—WILSON, Am. Orn. IV, 1811, 27; pl. xxix, f. 2.—WAGLER, Syst. Av. 1827, No. 2.—AUD. Orn. Biog. II, 1834, 94: V, 533; pl. 111.—IB. Birds Amer. IV, 1842, 266; pl. 257.

Picus (Dryotomus) pileatus, SW. F. Bor. Am. II, 1831, 304.

Dryotomus pileatus, BP. List. 1838.

Dryocopus pileatus, BONAP. Consp. Av. 1850, 132.

Dryopicus pileatus, BON. Consp. Zyg. Aten. Ital. 1854, 8.

Hylatomus pileatus, BAIRD, Gen. Rep. Birds, p. 107.

SP. CH.—Fourth and fifth quills equal and longest; third intermediate between sixth and seventh. Bill blue black. General color of body, wings, and tail dull greenish black. A narrow white streak from just above the eye to the occiput; a wider one from the nostril feathers (inclusive) under the eye and along the side of the head and neck; sides of the breast, (concealed by the wing,) axillaries, and under wing coverts, and concealed bases of all the quills, with chin and beneath the head, white, tinged with sulphur yellow. Entire crown from the base of the bill to a well developed occipital crest, as also a patch on the ramus of the lower jaw, scarlet red. A few faint white crescents on the sides of the body and on the abdomen. Length, about 18 inches; extent, 29; wing, 9½. Bill bluish dusky, paler below.

Female without the red on the cheek, and the anterior half of that on the top of the head replaced by black.

Hab.—North America from Atlantic to Pacific.

The pileated woodpecker, or "log cock," is an abundant and constant resident in the forests of the Territory. Early in April I discovered a pair on Whitby's island, burrowing out a hole for their nest in a dead trunk about 30 feet from the ground. They worked alternately, and were very watchful, keeping perfectly silent while they heard any noise near by. I only found the place by noticing chips on the bushes below, and, after watching silently for some time, one of them began to work, now and then protruding its bill full of chips, and, after cautiously looking round, dropping them.

Their shy and retiring habits are in strong contrast with those of the flicker, which often builds near dwellings and is much more familiar. Their loud call is, however, quite similar.—C.

The log cock is abundant in the vicinity of Fort Steilacoom during summer.—S.

MELANERPES TORQUATUS, Bonap.

Lewis' Woodpecker.

Picus torquatus, WILSON, Am. Orn. III, 1811, 31; pl. xx.—WAGLER, Syst. Av. 1827, No. 82.—AUD. Orn. Biog. V, 1839, 176; pl. 416.—IB. Birds Amer. IV, 1842, 280; pl. 272.

Melanerpes torquatus, BP. Consp. 1850, 115.—HEERMANN, J. A. N. Sc. Phil. 2d ser. II, 1853, 270.—NEWBERRY, Zool. Cal. & Or. Route, 90; in P. R. R. Surv. VI, 1857.—BAIRD, Gen. Rep. Birds, p. 115.

Picus montanus, ORD, in Guthrie's Geog. 2d Am. ed. II, 1815, 316.

SP. CH.—Feathers on the under parts bristle-like. Fourth quill longest; then third and fifth. Above dark glossy green. Breast, lower part of the neck and a narrow collar all round hoary grayish white. Around the base of the bill and sides of the head to behind the eyes, dark crimson. Belly blood red, streaked finely with hoary whitish. Wings and tail entirely

uniform dark glossy green. Female with the markings more obscure. Length about 10.75 inches; extent, 21; wing, 6.50. Female smaller. Iris brown, bill black, feet gray. Tongue, when drawn out to its fullest extent, projects 1.50 inch beyond bill.

Hab.—Western America from Black hills to Pacific.

The "collared" woodpecker, called also "Lewis'," in honor of the indefatigable explorer of the northwest, is one of the most beautiful of all the species, and perhaps, of all, the least like a woodpecker in its habits. It is abundant during summer in all the interior districts, never approaching the cooler coast, where few of the trees grow which it prefers to inhabit. It arrives at Puget Sound early in May, and some remain during mild winters in the Territory, though in the very cold winter of 1853-'54 none remained at Vancouver. It seems to enjoy the hottest weather, and at mid-day may often be seen perched on a dry limb, from which it will sail off in pursuit of insects, and return, circling and flapping, to its perch. It also sometimes glides down to the ground after grasshoppers, and searches carefully among the branches and leaves for insects, disdaining to toil for its food like its laborious relatives, at least during summer. In winter it is probably compelled to work, after its favorite autumn food of berries is gone, but at other times it rarely ever raps on the trees. So little do its habits resemble those of the genus, that Nuttall compares the blackish flock of young in fall to the English jackdaw. It, however, burrows holes for its nest, at all heights from the ground, commonly in a dead tree. Its brilliant and soft plumage resembles more that of some tropical bird than the plain woodpeckers which are its companions in this northern climate. As it wheels and flutters slowly around the trees, the brilliant metallic green and rich carmine flash in the sun like the fiery tints of the humming bird. Its flight is always very different from that of other woodpeckers. Besides that above described, it has a travelling flight, which, instead of being a succession of undulating and rapid movements, is rather labored and steady flapping, somewhat like that of the jay. The notes of this bird seem to be few; a harsh call, rarely uttered in summer, when it seeks concealment for itself and nest, is quite unlike any other woodpecker's cry. The flocks of young, which in fall associate together to numbers of eight or ten, are more noisy, though even then quiet compared to the flicker. The Californian woodpecker, as I have seen it in the autumn, resembles this bird somewhat in habits, but seems not to feed so much on fruit, and in cries, flight, and habits to resemble much more the common woodpecker. In brilliancy and richness of plumage it however equals but does not surpass this species.—C.

Lewis' woodpecker is very abundant throughout the more open portions of the timbered region of the northwest coast, preferring oak "openings" and groves. At Fort Dalles, on the Columbia, they are extremely numerous, not only breeding there during summer, but also found as winter residents. Their breeding places are generally holes in oak and other trees, which, from the appearances of those I have examined, seem as if they had been excavated for the purpose. The species is also found at Puget Sound, but is much less abundant there than on the Columbia near Fort Dalles. At the latter place they are constant winter residents. They have many habits in common with the various species of their relatives of the genus *Colaptes*. They seem in winter to be semi-gregarious, flying singly, yet still keeping more or less in each other's company. Their flight at this season is high and very erratic, resembling much, in its characteristic peculiarities, that of the swallow. On warm days they keep up a lively chattering noise, unlike, in character, that of any other woodpecker that I have heard. During the cold season they are so shy that it is difficult to shoot them, as at the least alarm

they betake themselves to the tops of the highest trees in the vicinity. They at that season subsist principally upon the larvæ of insects, found in the cracks and fissures of the "red pine" of the country. I dissected a specimen killed at Fort Dalles, January 9, 1855, finding the coats of the stomach (gizzard) very thick and muscular, its cavity filled with the white larvæ of insects, together with fine gravel. The thick nature of the coats of the stomach renders it well adapted to the digestion of berries and seeds, which probably form a large portion of the bird's sustenance during the warmer months.—S.

COLAPTES MEXICANUS, Swainson.

Red-shafted Flicker.

Colaptes mexicanus, Sw. Syn. Mex. Birds, in Philos. Mag. I, 1827, 440.—IB. F. Bor. Am. II, 1831, 315.—NEWBERRY, Zool. Cal. & Or. Route, 91; P. R. R. Rep. VI, 1857.—BAIRD, Gen. Rep. Birds, p. 120.

Picus mexicanus, AUD. Orn. Biog. V, 1839, 174; pl. 416.—IB. Birds America, IV, 1842, 295; pl. 274.

Colaptes collaris, VIGORS, Zool. Jour. IV, Jan. 1829, 353.—IB. Zool. Beechey's Voy. 1839, 24; pl. ix.

Picus rubricatus, WAGLER, Isis, 1829, v, May, 516. "(Lichtenstein Mus. Berol.)"

SP. CH.—Shafts and under surfaces of wing and tail feathers orange red. A red patch on each side the cheek; nape without red crescent; sometimes very faint indications laterally. Throat and stripe beneath the eye bluish ash. Back glossed with purplish brown. Female without the red cheek patch. Length about 12.50 to 14 inches; extent, 21 inches; wing over 6½ inches. Female smaller. Iris dark brown, bill black, feet greyish.

ADDITIONAL CHARACTERS.—Spots on the belly, a crescent on the breast, and interrupted transverse bands on the back, black.

Hab.—Western North America from the Black Hills to Pacific.

This bird, called "highholder," "flicker," or "clape," by emigrants from various parts of the States, and even "yellow hammer" by some, though it has not a particle of yellow in its plumage, is so abundant along the western coast, as its closely allied cousin, known by the same names, is on the eastern side of the Mississippi. It also resembles that bird so exactly in habits and notes that, as Nuttall observed, the description of one will apply with exactness to the other. It is a constant resident in Washington Territory, at least west of the Cascade mountains. I observed them already burrowing out the holes for their nests in April at the Straits of De Fuca. About June 1st, I found a nest containing seven young nearly fledged, which already showed in the male the red moustache, distinguishing it from the female. Their food consists at all times more of insects and fruits than of the larvæ found by other woodpeckers in trees, and they spend much of their time on the ground.—C.

Extremely common in the timbered districts of Washington Territory. Habits, voice, calls, &c., precisely similar to those of the yellow hammer of the eastern States.

Woodpeckers, as a group, are abundantly represented in both of our northwest Territories. The most abundant species, I think, is the *C. Mexicanus*; next the *P. Gardneri*; Harris' and Lewis' stand next and about equal; *P. Ruber* and *Melanerpes albolarvatus* about equal, but scarce. I have never seen the Californian woodpecker "*Melanerpes formicivorus*" so far north as Oregon, although there are many acorn-bearing oaks, especially at Fort Dalles, to afford it winter subsistence. Still I am by no means prepared to say that the species does not extend into Oregon; on the contrary, I am inclined to think that it will yet be found as far north as the Columbia river.—S.

ORDER III. INSESSORES. Perching Birds.

Family TROCHILIDAE. The Humming Birds.

SELASPHORUS RUFUS, Swainson.

Red-backed Humming Bird.

Trochilus rufus, GMELIN, Syst. Nat. I, 1788, 497.—AUD. Orn. Biog. IV, 1838, 555; pl. 372.

Selasphorus rufus, SWAINSON, F. Bor. Am. II, 1831, 324.—IB. AUD. Birds Am. IV, 1842, 200; pl. 254.—BAIRD, Gen. Rep. Birds, p. 134.

? *Trochilus ruber*, L.—ORN, I, 1788, 499. (Fide Bonaparte.)

SP. CH.—Tail strongly cuneate and wedge-shaped. Upper parts, lower tail coverts, and breast cinnamon. A trace of metallic green on the crown, which sometimes extends over the back, never on the belly. Throat coppery red, with a well developed ruff of the same; below this a white collar. Tail feathers cinnamon, edged or streaked at the end with purplish brown.

Female with the rufous of the back covered or replaced with green; less cinnamon on the breast. Traces only of metallic feathers on the throat. Tail rufous, banded with black and tipped with white; middle feathers glossed with green at the end. Tail still cuneate. Length of male, 3.50; wing, 1.55; tail, 1.30.

Hab.—West coast of North America, and across from Gulf of California to the Upper Rio Grande valley.

The Nootka Sound humming bird is abundant in the western portions of both Oregon and Washington Territories, and Vancouver Island. It also, probably, extends as far north as Russian America. It is, indeed, a beautiful little creature, when alive favorably comparing with even the most elegant species of this universally admitted brilliant tribe of birds. Considering the size of the species, they are very hardy, being one of the earliest of the migratory birds to arrive in spring. In 1856, at Fort Steilacoom, (latitude $47^{\circ} 12'$ north,) they arrived from the south about April 10, the first one I obtained being on the 11th of that month. The Straits of Juan de Fuca, lying between Vancouver Island and the northern portion of Washington Territory, are about fifteen miles wide. To reach Nootka Sound, on the north side of Vancouver Island, they are obliged to fly across the straits. Captain Boyling, of the brig Willimantic, informed me that while he was sailing through the straits in September, 1856, seven of these little humming birds, of different sizes, flew on board his vessel. This would indicate that the commencement of the southern migration is in that month; probably more induced by the scarcity of flowers than by cold, which is generally not much felt before the middle of October, and in some seasons not until December. In Washington Territory this species commences to incubate about May 10, at which time, and just before, the most fierce and angry battles are continually occurring between the males. These battles were generally fought by "tilting" at each other at "full speed," all the time keeping up loud and vociferous squeaks and buzzing sounds, resembling somewhat those produced by the common Atlantic species under similar circumstances. A nest and eggs of this species I obtained at Newaukam prairie, five miles from Fort Slaughter, Washington Territory, May 23, 1856. The female, while on the nest, allowed a very near approach, so near as almost to admit being grasped by my hand. She had, what I noticed in another female specimen, and what is also referred to by Nuttall, a rudimentary metallic ruff on the throat. The nest was situated in a forked branch of a "snowberry" bush, and was composed, principally, of fine green moss, lined internally with the delicate floss of the cotton-wood poplar, and externally bordered in relief, most artistically, with rock lichens, apparently attached for no other purpose than to beautify.

Nest.—Diameter of cavity at entrance 10 lines.
 Depth at the centre $7\frac{1}{2}$ "
 Diameter of the *whole nest* across the top 2 inches.
 Height of the *whole nest* 1 inch 5 lines.
 Eggs, two; *white*, nearly equally blunt at both ends; weight of both eggs, about 13 grains—*i. e.*, about $6\frac{1}{2}$ grains each, although there was a slight difference in their sizes. Length of each, about $5\frac{1}{2}$ lines. Transverse diameter, nearly 4 lines. They were almost hatched. The nest, with its contents, I sent to the museum of the Smithsonian Institution.

Measurement and notes concerning particular specimens obtained in 1856, at Fort Steilacoom, Puget's Sound, Washington Territory:

April 11. No. 311. *S. rufus*. ♂. Length, $3\frac{1}{2}$; extent, $4\frac{1}{4}$. From tip of bill to angle of eye, $\frac{7}{8}$ of an inch.

April 18. No. 312. *S. rufus*. ♂. Length, $4\frac{1}{6}$; extent, $4\frac{1}{8}$. Bill to angle of eye, $\frac{7}{8}$. Weight of bird, 45 grains.

April 28. No. 330. ♀. Length, $3\frac{7}{8}$; extent, $4\frac{1}{6}$. Bill, $\frac{6}{8}$. Bill larger than usual. Bright metallic luster on the collar as before noticed. (Vide Nuttall's queries.)—S.

The Nootka humming bird is very abundant in Washington Territory, reaching the Straits of De Fuca as early as March 17th, when I saw them in considerable numbers. They seem to follow the blossoming of the red-flowered currant, which abounds in the fir forests, and is the first to open in abundance enough to supply them with food. This begins to bloom at the Columbia river about March 10.

In appearances and habits this bird much resembles the ruby-throat, from which the female and young are difficult to distinguish. But the male, besides its peculiar livery, has a very remarkable habit when a stranger or wild animal approaches its nest, and even at other times, of rising to a great height in the air and then darting down perpendicularly, producing a hollow rushing sound, (called "bleating" by Nuttall,) analogous to that made by the night hawk in a similar manner, but of a sharper tone. In both cases it is probably produced by the wings. I never obtained but one nest, which was built on a small bush a few feet from the ground, and was composed of hairs and cotton-like vegetable materials. It contained nothing at the time. In July, there being few flowers in the lower country, they seek the mountain summits, and I found them abundant in August at a height of 5,800 feet above the level of the sea, where, at the same time, ice formed nightly at our camp. They all leave the Territory in September, and, I think, winter in California, where I saw humming birds in December feeding among the blossoms of another species of flowering currant, then also the harbinger of early spring.—C.

Family CYPSELIDAE. The Swifts.

CHAETURA VAUXII, De Kay.

Oregon Swift.

Cypselus vauzii, TOWNSEND, J. A. N. Sc. VIII, 1839, 148, (Col. river.)—IB. Narrative, 1839.

Chaetura vauzii, DEKAY, N. Y. Zool. II, 1844, 36.—BAIRD, Gen. Rep. Birds, p. 145.

Acanthylis vauzii, BONP. Comptes Rendus, XXVIII, 1854; notes Delattre, 90.—CASSIN, Ill. I, 1855, 250.—

NEWBERRY, Zool. Cal. and Or. Route, 78; P. R. R. Surv. VI, 1857.

SP. CH.—Light sooty brown; rump and under parts paler; lightest on the chin and throat. Length, 4.50 inches; wing, 4.75; tail, 1.90.

Hab.—Pacific coast, from Puget Sound to California.

I never saw anything like a chimney swallow in any part of the country, and think that the Columbia must be the limit of migration to *Vauxii*. I think, however, I should have noticed it at Vancouver, if found there, in June and July, 1853. Dr. Kennerly has, however, since sent one from the Straits of Fuca, showing that it sometimes extends its migrations up to the 49th parallel.—C.

This bird was obtained by Dr. Townsend at Fort Vancouver, on the Columbia river, the point where Dr. Townsend obtained the greater part of his collection. I have never been able to procure a specimen of this bird, and therefore presume that it is of very rare occurrence.—S.

Family CAPRIMULGIDAE. The Goat-suckers.

ANTROSTOMUS NUTTALLI, Cassin.

Nuttall's Whippoorwill.

Caprimulgus nuttalli, AUD. Birds America, VII, 1843; pl. 495 appendix.

Antrostomus nuttalli, CASSIN, J. A. N. Sc. Phila. 2d series, II, 1852, 123.—IB. III. I. 1855, 237.—NEWBERRY, Zool. Cal. and Oregon Route, 77; Rep. P. R. R. Surv. VI, IV.—BAIRD, Gen. Rep. Birds, p. 419.

SP. CH.—Bristles without lateral filaments; wing about $5\frac{1}{2}$ inches; top of the head hoary gray, with narrow transverse, not longitudinal bands. Tail nearly black on the terminal half, the extreme tip only (in the three outer feathers of each side) being white for nearly an inch. Length, 8; wing, 5.50; extent, 17.50; iris, brown; bill and feet, gray.

Hab.—High central plains to the Pacific coast.

Nuttall's whippoorwill I have found only in the open country east of the Cascade mountains, where, in the summer of 1853, it was common near the Yakima river. The two specimens I obtained were killed with a whip in the daytime, being probably dazzled by the sunshine when started from the ground. Late in the evening I saw them flying near the ground and making a singular hollow sound as they sat on it, where I could not distinguish them in the twilight. I shot one in California as late as November 6. It would start close to my feet, fly short distances very irregularly, and alight on the ground. It was silent at that season.—C.

This bird, well known as an inhabitant of the far west, is moderately abundant in the great arid interior of Washington and Oregon Territories. Along the coast I have never seen or heard one of the species, but east of the Cascade mountains, at Fort Dalles, on almost any fine night in spring and early in summer they can be heard uttering their cries. These closely resemble that of the Atlantic species, (*A. vociferus*), but are proportionately more feeble, and are not so incessantly kept up.—S.

CHORDEILES POPETUE, Baird.

Night Hawk; Bull Bat.

Caprimulgus popetue, VIELLOT, Ois. Am. Sept. I, 1807, 56; pl. xxiv. (♀).—BONAP. Obs. Wilson, 1825, 177, from J. A. N. Sc. Phila. VI.

Caprimulgus americanus, WILSON, V, 1812, 65; pl. cxi. f. 1, 2.

Chordeiles americanus, DE KAY, N. Y. Zool. II, 1844, 34; pl. xxvii.

Caprimulgus virginianus, BRISSON, II, 1760, 477. (In part only).—BONAP. Synopsis, 62.—AUD. Orn. Biog. II, 1834, 273; pl. 147.

Caprimulgus (Chordeiles) virginianus, SW. F. Bor. Am. II, 1831, 62.

Chordeiles virginianus, BON. List. 1838.—AUD. Birds Am. I, 1840, 159; pl. 43.—CASSIN, Ill. I, 1855, 238.—NEWBERRY, Zool. Cal. and Oregon Route, 79; Rep. P. R. R. Surv. VI, 1857.

Chordeiles popetue, BAIRD, Gen. Rep. Birds, p. 151.

SP. CH.—Male, above greenish black, with but little mottling on the head and back. Wing coverts varied with grayish; scapulars with yellowish rufous. A nuchal band of fine gray mottling, behind which is another coarser one of rufous spots. A white V-shaped mark on the throat; behind this a collar of pale rufous blotches, and another on the breast of grayish mottling. Under parts banded transversely with dull yellowish or reddish white and brown. Wing quills quite uniformly brown. The five outer primaries with a white blotch midway between the tip and carpal joint, not extending on the outer web of the outer quill. Tail with a terminal white patch.

Female, without the caudal white patch, the white of the throat mixed with reddish. Length of male, 9.50; wing, 8.20.

Hab.—North America generally.

The nighthawk is very abundant in the interior of the Territory, arriving at Puget Sound about June 1, and remaining until September. At Vancouver, in June, the monotonous cry of this bird was audible day and night, as it flew high above the tall spruces. In the evening they would fly low, and light near houses on the ground.—C.

Abundant at Fort Dalles and on the prairies near Puget Sound. At Fort Steilacoom I first noticed the arrival of this bird from the south, in 1854, on the 1st of June, and in 1856, on the 3d of June, soon after which it became, in both seasons, quite plentiful. In habit, voice, &c., I noticed no difference from the same bird on the Atlantic.—S.

Family ALCEDINIDAE.—Kingfishers.

CERYLE ALCYON, Boie.

Belted Kingfisher.

Alcedo alcyon, LINNAEUS, Syst. Nat. I, 1766, 180.—WILSON, Am. Orn. III, 1811, 59.—AUDUBON, Orn. Biog. I, 1831, 394; pl. 77.—IB. Birds America.

Ceryle alcyon, BOIE, Isis, 1828, 316.—CASSIN, Illust. I, 1855, 254.—BREWER, N. Am. Oology, I, 1857, 110; pl. iv, fig. 52. (Egg).—BAIRD, Gen. Rep. Birds, p. 158.

Ispida ludoviciana, GMELIN, Syst. Nat. I, 1788, 452.

SP. CH.—Head with a long crest. Above blue, without metallic lustre. Beneath, with a concealed band across the occiput; and a spot anterior to the eye, pure white. A band across the breast, and the sides of the body under the wing, like the back. Primaries white on the basal half, the terminal unspotted. Tail with transverse bands and spots of white.

Young, with the sides of body and a transverse band across the belly below the pectoral one, light chestnut; the pectoral band more or less tinged with the same. Length of adult about 12 $\frac{3}{4}$ inches; wing, 6 or more.

Hab.—The entire continent of North America.

The common kingfisher is abundant throughout the year along every stream, as well as the coast, where it burrows out holes in cliffs surrounding the bays and inlets. It probably does not retire southward, except in those uncommon winters when all the fresh water becomes frozen.—C.

Very abundant throughout Washington and Oregon Territories. The habits of this bird on the Pacific coast differ in no respect from those of individuals found in the older States. It is very generally distributed throughout Washington Territory.—S.

Family COLOPTERIDAE.—The Flycatchers.

TYRANNUS CAROLINENSIS, Baird.

King Bird; Bee Martin.

Lanius tyrannus, LINN. Syst. Nat. I, 1766, 136. This belongs to the Cuban *T. matulinus*, according to Bonaparte.

Muscicapa tyrannus, (BRISSON?) WILSON, Am. Orn. I, 1808, 66; pl. xiii.—AUD. Orn. Biog. I, 1832, 403; V, 1839, 420; pl. 79.—IB. Birds Amer. I, 1840, 204; pl. 56.

Lanius tyrannus, var. γ *carolinensis ludovicianus*, GMELIN, Syst. Nat. I, 1788, 302.

Muscicapa rex, BARTON, Fragments, N. H. Penna. 1799, 18.

Tyrannus pipiri, VIELLIOT, Ois. Am. Sept. I, 1807, 73; pl. xliv.—CAB. Journ. Orn. III, 1855, 478.

Tyrannus intrepidus, VIELLIOT, Galerte Ois. I, 1824, 214; pl. 133.—SWAINSON, Mon. Ty. Shrikes Quart. Jour. 1826, 274.

Tyrannus carolinensis, BAIRD, Gen. Rep. Birds, p. 171.

SP. CH.—Two, sometimes three, outer primaries abruptly attenuated at the end. Second quill longest; third little shorter; first rather longer than fourth, or nearly equal. Tail slightly rounded. Above dark bluish ash. The top and sides of the head to beneath the eyes bluish black. A concealed crest on the crown, vermilion in the centre, white behind, and before partially mixed with orange. Lower parts pure white, tinged with pale bluish ash on the sides of the throat and across the breast; sides of the breast and under the wings similar to, but rather lighter than, the back. Axillaries pale grayish brown, tipped with lighter. The wings dark brown, darkest towards the ends of the quills; the greater coverts and quills edged with white, most so on the tertials; the lesser coverts edged with paler. Upper tail coverts and upper surface of the tail glossy black, the latter very dark brown beneath; all the feathers tipped, and the exterior margined externally with white, forming a conspicuous terminal band about .25 of an inch broad. Length, 8.75; extent, 15 inches; wing, 4.65 inches; tail, 3.70; tarsus, .75. Iris brown; bill, &c., black.

Hab.—Eastern North America to Rocky mountains. West of this found only in Washington Territory.

The common king bird of the Atlantic States is abundant during summer, arriving with the preceding and having the usual habits of the species.—C.

The tyrant fly-catcher or king bird I found quite plentiful as far west as the eastern base of the Rocky mountains. Again I found it, more sparingly, however, at Puget Sound, where I obtained several skins. The habits of this bird in Oregon do not differ from those recorded of the same bird east of the mountains. They appear to shun the dense forests near Puget Sound, but are found moderately plentiful in the groves of low oaks, and among the cottonwood tress fringing the prairie lakes of the Nisqually plains, where, on the 5th of August, 1853, I obtained a nest containing young nearly fledged.—S.

TYRANNUS VERTICALIS, Say.

Arkansas Flycatcher.

Tyrannus verticalis, SAY, Long's Exped. II, 1823, 60.—NUTTALL, Man. II, 2d ed. 1840, 306.—BAIRD, Gen. Rep., Birds, p. 173.

Muscicapa verticalis, BONAP. Am. Orn. I, 1825, 18; pl. xi.—AUD. Orn. Biog. IV, 1838, 422; pl. 359.—IB. Birds Amer. I, 1840, 199; pl. 54.

SP. CH.—The four exterior quills attenuated very gently at the end, the first most so; third and fourth quills longest, second and fifth successively a little shorter. Tail slightly forked; bill shorter than the head. Crown, sides of head above the eyes, nape, and sides of neck pale lead color or ash gray; a concealed crest in the crown, vermilion in the centre, and yellowish before and behind. Hind neck and back ash gray, strongly tinged with light olivaceous green, the gray turning to brown on the rump; upper tail coverts nearly black, lower dusky; chin and part of ear coverts dull white; throat and upper part of breast similar to the head, but lighter, and but slightly contrasted with the chin; rest of lower parts, with the under wing coverts and axillars, yellow, deepening to gamboge on the belly, tinged with olivaceous on the breast. Wing brown, the coverts with indistinct ashy margins; secondaries and tertials edged with whitish; inner webs of primaries whitish towards the base. Tail nearly black above and glossy, duller brownish beneath; without olivaceous edgings. Exterior feather, with the outer web and the shaft, yellowish white; inner edge of latter brown. Tips of remaining feathers paler. Bill and feet dark brown.

Female rather smaller, and colors less bright. Length of male, 12 inches; extent, 19 inches; wing, about 4.50; length of female, 9 inches; extent, 15.50; iris brown; bill and feet black.

Hab.—Western North America, from the high central plains to the Pacific.

This *western king bird* arrives at Puget Sound in June, together with the common species, with which they associate for some time after without any hostility, though their similar habits and food would apparently lead to dispute. I have even seen them together in parties of four

in June, about the period of mating. They pursue insects in the same manner as the other species, and often descend to the ground for grasshoppers, &c. Their cries are harsh and loud, not deserving the name of a song. They never approach the coast, though so common in almost every other part of the country west of the Mississippi.—C.

This bird is abundant during the summer, both in the central and western sections of Oregon Territory and Washington Territory. In 1856 I first noticed their arrival from the south about May 15. At Fort Dalles, in 1855, I obtained them, I think, a little earlier. They then appeared simultaneously with the *Icterus Bullockii*. At Fort Steilacoom their arrival in 1856 was at about the same time as that of the *Pyranga Ludoviciana*, *Columbia fasciata*, *Denaidura Carolinensis*, and others.

The first notification of the arrival of this species in the spring is the occurrence of the quarrels and skirmishes incident to their courtships. Like the other birds of this family, they are remarkably quarrelsome and pugnacious, so much so that, during the commencement of the breeding season, whenever they were moderately plentiful, I could scarcely cast my eyes in any direction without witnessing jealous conflicts in which two or more of these little creatures, with harsh, squeaking clamor, were most madly engaged. The battles were generally fought in the air, and presented ludicrous alternations of pursuit and flight.

The breeding places at Fort Dalles were in oak trees by preference.—S.

CONTOPUS BOREALIS, Baird.

Olive-sided Flycatcher.

Tyrannus borealis, Sw. & Rich. F. Bor. Am. II, 1831, 141; plate.

Muscicapa cooperi, Nuttall, Man. I, 1832, 282.—Aud. Orn. Biog. II, 1834, 422: V, 1839, 422; pl. 174.—Ib.

Synopsis, 1839, 41.—Ib. Birds Amer. I, 1840, 212; pl. 58.

Tyrannus cooperi, Bonap. List, 1838.—Nuttall, Man. I, 2d ed. 1840, 298.

Contopus cooperi, Cabanis, Journal für Ornithol. III, Nov. 1855, 479.

Muscicapa inornata, Nuttall, Man. I, 1832, 282.

Contopus borealis, Baird, Gen. Rep. Birds, p. 188.

SP. CH.—Wings long, much pointed; the second quill longest; the first longer than the third. Tail deeply forked. Tarsi short. The upper parts ashy brown, showing darker brown centres of the feathers; this is eminently the case on the top of the head; the sides of the head and neck, of the breast and body resembling the back, but with the edges of the feathers tinged with gray, leaving a darker central streak. The chin, throat, narrow line down the middle of the breast and body, abdomen, and lower tail coverts white, or sometimes with a faint tinge of yellow. The lower tail coverts somewhat streaked with brown in the centre. On each side of the rump, generally concealed by the wings, is an elongated bunch of white silky feathers. The wings and tail very dark brown, the former, with the edges of the secondaries and tertials, edged with dull white. The lower wing coverts and axillaries grayish brown. The tips of the primaries and tail feathers rather paler. Feet and upper mandible black, lower mandible brown. The young of the year similar, but the color duller; the feet light brown. Length, 8.50 to 7.75; extent, 10.50 to 13; wing, 4.33; tail, 3.30; tarsus, .60. Iris brown; feet black; bill black above, horn color below. Female smaller.

Hab.—Rare on the Atlantic and Pacific coasts of the United States. Not observed in the interior, except to the north. Found in Greenland. (Reinhardt.)

The olive-sided flycatcher is very common, arriving early in May, and frequenting the borders of woods, where, from the summit of some tall dead tree, its loud melancholy cry resounds through the day during the whole of summer. It frequents the small pine groves along the coast as well as the interior, and remains until late in September.—C.

I obtained a specimen of a bird at Fort Steilacoom, July 10, 1856, which agreed in many respects with Nuttall's description of this species. From my note book I extract the following remarks: "No. 454. ♂. 6½, 10½. Upper mandible nearly black; lower dusky (purplish?

Nuttall,) *horn color*, darker at the tip. Lining membrane of the mouth, *yellow orange*; feet and legs, *black*; iris, *hazel*. Tail extends about $1\frac{1}{4}$ inches beyond the folded wings." This skin was unfortunately lost in my missing collection of July and August, 1856.

This bird is not abundant on Puget Sound, and it is but seldom that a specimen can be obtained. But this is partly owing to the preference it has for shady thickets and dense foliage, where it is with difficulty shot.—S.

EMPIDONAX PUSILLUS, Cabanis.

Tyrannula pusilla, Sw. F. B. Am. II, 1831, 144; pl.—RICH. App. Back's Voyage, 1834-'36, 144.—GAMBEL, Pr. A. N. Sc. III, 1847, 156.

Muscicapa pusilla, AUD. Orn. Biog. V, 1839, 288; pl. 434.—IB. Birds Amer. I, 1840, 236; pl. 66.

Tyrannus pusilla, NUTTALL, Man. I, 2d ed. 1840.

? "*Empidonax pusillus*, CAB." BAIRD, Gen. Rep. Birds, p. 194.

SP. CH.—Second, third, and fourth quills longest; first shorter than the sixth. Tail even. Tarsi rather long. Above dirty olive brown, paler and more tinged with brown towards the tail. Throat and breast white, tinged with grayish olive on the sides, shading across the breast; belly and under tail coverts very pale sulphur yellow. Wings with two dirty narrow brownish white bands slightly tinged with olive; the secondaries and tertials narrowly and inconspicuously margined with the same. First primary faintly edged with whitish; the outer web of first tail feather paler than the inner, but not white. Under wing coverts reddish ochraceous yellow. A whitish ring round the eye. Length, 5.50 inches; extent, 8.50; wing, 2.80; tail, 2.75. Iris, brown; bill and feet, black; lower mandible, pale flesh color.

Hab.—High central plains to the Pacific. Fur countries. Southward into Mexico.

The little pewee of Nuttall is one of the few birds that frequent the dark and gloomy spruce forests, which it seems to prefer to more open places. It is most abundant near the coast, but I have seen a few at Puget Sound, where they arrived about the 25th of April. It is difficult to get a sight of this small musician as it flits through the upper branches of the tall spruces, uttering constantly its monotonous but lively ditty. Its colors make it almost invisible in the shade.

It is also a common species about Puget Sound in summer. I could not discover its nest. I observed that one of them kept constantly on the border of a small pond, and drove the kingbird away from the place. It has a peculiar short and lisping song of three notes in summer, very different from other species. In fall the young birds make a very different loud call as they wander about the woods.

I did not find the nest of this bird. By the first of September they have all retired southward.

NOTE.—The difference in color of lower mandible observed in this and some other western birds may be of value as a specific distinction in connexion with other points stated by Prof. Baird.—C.

Quite abundant in the vicinity of Fort Steilacoom, where it arrives early in May. It seems to prefer the vicinity of bushes and low trees at the *edges* of dense forests. In 1856 I obtained at Fort Steilacoom the following: No. 396. May 19. $6\frac{1}{8}$, 9.—No. 421. June 3. 6, $8\frac{3}{4}$.—No. 443. June 18. $6\frac{1}{4}$, $8\frac{3}{4}$.

I found this bird rather less pugnacious than others of the group, and in habits generally more resembling the Vireo family. Its notes are short but sweet, and just after sundown on warm summer evenings particularly low, plaintive, and soothing.—S.

Family TURDIDAE.

Sub-Family TURDINAE.—The Thrushes.

TURDUS USTULATUS, Nuttall.

Turdus ustulatus, NUTTALL, Man. Orn. I, (2d ed.) 1840, 400. Columbia river; (printed *cestulatus* by a typographical error.)—BAIRD, Gen. Rep. Birds, p. 215.

SP. CH.—Third and fourth quills longest; second intermediate between fourth and fifth. Tail nearly even. Upper parts uniform reddish brown, with a faint olivaceous tinge. Fore part of the breast tinged with brownish yellow, becoming paler to the chin; the remaining under parts are white. The sides of the throat and the fore part of the breast, with small distinct triangular spots of well defined brown, much darker than the back; the sides of the breast more obsoletely spotted, and the sides of the body washed with olivaceous yellow brown. The tibiae are yellowish brown. Nearly the whole of the lower mandible, except the rami, is brown. Length, 7.25 to 8; extent, 11.75 to 12.25; wing, 3.75; tail, 3.00; tarsus, 1.12. Iris, brown; legs, light brown; bill, brown; lower mandible, yellow at base.

Hab.—Coast region of Oregon and Washington Territories.

The “western thrush” of Nuttall is one of the most common summer residents in the wooded part of the Territory, arriving in May and remaining until the beginning of September. It closely resembles Wilson’s in appearance and habits, but quite distinct. Its song is similar, but shorter, and without the metallic ringing sound of that bird. It frequents the borders of woods and bushes along streams, and, except just after its arrival, is not very shy. About the middle of June I found its nests containing eggs built commonly on a small horizontal branch, and very strongly constructed of twigs, grass roots, and leaves, sometimes covered outside entirely with moss, which, in the damp climate near the coast, grows, and forms large masses. It appears to raise two broods, as I have found a nest with eggs in it as late as July 13. The eggs, unlike those of most thrushes, are white, spotted thickly with brown, and four or five in number. This thrush sings most in the early morning and evening, when numbers may be heard answering each other from all sides. They do not seek the darkness of thickets so much as the hermit thrush, but often feed in gardens, &c., in the sunshine.—C.

This bird is quite abundant west of the Cascade mountains. In the neighborhood of Fort Steilacoom, at the edges of the large forests and in the vicinity of swamps and damp lands, this bird is found abundantly in spring and summer. It has a great faculty for hiding itself securely, and, although very numerous, is difficult to obtain. Its voice is a low, soft, sad, lonely, whistle, generally confined to one note about three seconds in length, and repeated at very regular intervals. One specimen, (No. 517,) shot August 2, 1856, at Fort Steilacoom, measured 7.62, 11. Another, a young bird, killed July 26, I find in my note book, had “the membrane at angle of mouth *lemon yellow*.”—S.

NOTE.—I have twice only seen a thrush resembling the hermit thrush in general appearance, but quite differently colored. The first was brought to me December 4, with its tail pulled out, having been caught in a house. It was of a very dark brown, *without* a tint of olive, and its breast more thickly marked with spots of the *same* color, large and round. I afterwards saw another, on Whitby’s island, in March, but could not get a shot at it. I suppose, therefore, it is a winter visitor only in the lower country. This seems to resemble *T. solitarius* of Wilson, (the brown thrush of Pennant and Latham?) and *T. minor* of Swainson, which was probably obtained far to the north.—C.

TURDUS MIGRATORIUS, Linn.

Robin.

Turdus migratorius, LINNÆUS, Syst. Nat. I, 1766, 292.—FORSTER, Philos. Trans. LXII, 1772, 382.—VIELLIOT, Ois. Am. Sept. II, 1807, 5; pl. lx, lxi.—WILSON, Am. Orn. I, 1808, 35; pl. ii.—DOUGHTY, Cab. Nat. Hist. I, 1830, 133; pl. xii.—BREHM, Handbuch Vög. Deutsch. 1831, 388, (European spec.)—AUDUBON, Orn. Biog. II, 1834, 190; pl. 131.—IB. Birds Amer. III, 1841, 14; pl. 142.—BONAPARTE, Conspectus, 1850, 272.—NEWBERRY, Zool. Cal. and Or. Route, 81; Rep. P. R. R. Surv. VI, 1857.—BAIRD, Gen. Rep. Birds, p. 218.

Merula migratoria, SW. & RICH, Fauna Bor. Amer. II, 1831, 176.

Planesticus migratorius, BONAPARTE. (?)

SP. CH.—Third and fourth quills about equal; fifth a little shorter; second longer than sixth. Tail slightly rounded. Above olive gray; top and sides of the head black. Chin and throat white, streaked with black. Eyelids, and a spot above the eye anteriorly, white. Under parts and inside of the wings, chestnut brown. The under tail coverts and anal region, with tibae, white, showing the blumbeous inner portions of the feathers. Wings dark brown, the feathers all edged more or less with pale ash. Tail still darker, the extreme feathers tipped with white. Length, 9.75; extent, 16; wing, 5.43; tail, 4.75; tarsus, 1.25. Bill, yellow, dusky along the ridge and at the tip; legs, black; iris, brown.

Hab.—Continent of North America to Mexico.

The robin is as abundant and familiar in all parts of this Territory as in the eastern States. It is also a constant resident and builds its nest in May. I noticed fledged young as early as June 10, at Puget Sound.—C.

This bird is very abundant in both Oregon and Washington Territories. I have secured many specimens for the sake of accurate comparison with eastern birds of the same species.—S.

TURDUS NAEVIUS, Gmelin.

Varied Thrush, or Painted Robin.

Turdus naevius, GMELIN, Syst. Nat. I, 1788, 817.—VIELLIOT, Ois. Am. Sept. 11, 1807, 10; pl. lxvi.—AUDUBON, Orn. Biog. IV, 1838, 489; V, 1839, 284; pl. 369 and 433.—IB. Birds Amer. III, 1841, 22; pl. 143.—BONAP. Conspectus, 1850, 271.—CABOT, Jour. Bost. Soc. N. H. III, 1848, 17. (Spec. shot near Boston.)—LAWRENCE, Annals N. Y. Lyc. V, June, 1852, 221. (Spec. shot near New York.)—NEWBERRY, Zool. Cal. and Or. Route, 81; Rep. P. R. R. Surv. VI, 1857.—BAIRD, Gen. Rep. Birds, p. 219.

Orpheus naevius, RICH, List, 1837.

Ixoreus naevius, BONAP. Notes Orn. Delattre, in Comptes Rendus, XXVIII, 1854, 269.

Orpheus meruloides, RICH. Fauna Bor. Amer. II, 1831, 187; pl. xxxviii.

SP. CH.—Fourth quill longest; third and fifth a little shorter; second much longer than sixth. Tail nearly even; the lateral feather shorter. Above, rather dark bluish slate; under parts generally, a patch on the upper eyelids continuous with a stripe behind it along the side of the head and neck, the lower eyelids, two bands across the wing coverts and the edges of the quills, in part, rufous orange brown; middle of belly white. Sides of the head and neck, continuous with a broad pectoral transverse band, black. Most of tail feathers with a terminal patch of brownish white. Female more olivaceous above; the white of the abdomen more extended; the brown beneath paler; the pectoral band obsolete. Length, 9 to 10; extent, 12¾ to 15¼ inches; wing, 5.00; tail, 3.90; tarsus, 1.25. Iris, brown; bill, black; feet, yellow.

Hab.—Pacific coast, North America. Accidental on Long Island and near Boston.

The varied thrush or western robin is common during winter, and I think a few remain near the coast all summer, as I have seen them in the dark spruce forests in June and July. They are much more shy and retiring than the robin, and differ very much in song, which, as I have heard it, consists only of five or six notes in a minor key, and in a scale regularly

descending. It is commonly heard in the tops of the trees, and in summer only in the densest of forests. In winter they associate with the robins, and feed much on the ground, sometimes coming around houses in cold weather.—C.

Obtained at Port Townsend, Puget Sound, and at Bellingham bay. Common at Astoria, O. T. Does not seem to extend very far inland, as it was not seen by me at Fort Steilacoom. In winter it is a shy bird, not generally becoming noticeable in the open districts until after a fall of snow, when many individuals may be seen along the sand beaches near salt water. They are at such times tame and abundant, at least sufficiently so for any ordinary shot to obtain a dozen specimens in a forenoon. I suppose that they are driven out of the woods, during the heavy snows, by hunger. It may then frequently be found in company with the common robin, with which it has many similar habits. It was during the continuance of a rather heavy fall of snow that I obtained the three specimens preserved. In my note book I find the following remark: "At this time of the year it is a very silent bird, quite tame, allowing near approach; flying up when the intruder comes too near, but alighting on the ground again at a short distance in front. It appears to be fond of flying by short stages in a desultory manner, sometimes alighting on the ground; at others on fences, bushes, or trees. The settlers here (at Port Townsend) call them spotted, painted, and golden robins." The most conspicuous mark on the bird which strikes the eye at first is the black crescent on the fore part of the breast.—S.

Sub-Family SAXICOLINAE.—Rock Thrushes.

SIALIA MEXICANA, Swainson.

Western Blue Bird.

Sialia mexicana, Sw. F. Bor. Am. II, 1831, 202.—BAIRD, Gen. Rep. Birds, p. 223

Sialia occidentalis, TOWNSEND, Jour. Ac Nat. Sc. VII, II, 1837, 188.—IB. Narrative, 1839, 343.—AUD. Synopsis, 1839.—IB. Birds America, II, 1841, 176; pl. 135.—NUTTALL, Man. I, (2d ed.) 1840, 513.—NEWBERRY, Zool. Cal. & Or. Route, 80; Rep. P. R. R., VI, IV, 1857.

Sylvia occidentalis, AUDUBON, Orn. Biog. V, 1839, 41; pl. 393.

Sialia caeruleo-collis, VIGORS, Zool. Beechey's Voyage, 1839, 18; pl. iii.

SP. CH.—Bill slender; head and neck all round, and upper parts generally, bright azure blue. Interscapular regions, sides, and fore part of the breast, and sides of the belly, dark reddish brown. Rest of under parts (with tail coverts) pale bluish, tinged with gray about the anal region. Female duller above; the back brownish; the blue of the throat replaced by ashy brown, with a shade of blue. Length, 6.50 to 7 inches; extent, 12½ to 13; wing, 4.25; tail, 2.90. Iris, brown; bill and feet, black.

Hab.—Pacific coast, North America, and along valley of Gila to upper Rio Grande and south.

The western blue-bird, though very similar to the common eastern species, has not that familiar confidence which makes the latter such a favorite. It seems to prefer the knot holes of the oaks to any box or similar shelter provided for it, but may, when trees are scarcer, become more dependent on man. It also differs in its song, which is not so loud as sweet, and is curiously performed to sound as if two birds were singing at once and in different keys. Its call note is also shorter than that of the eastern bird.

Most of this species probably remain during the winter in the Territory, as I have seen them in December and early in March. They then associate in flocks, which frequent roadsides and fences, feeding on insects or berries. They have the same mode of hovering over a field, to watch for grasshoppers, &c., that we see in the eastern species.—C.

This bird is exceedingly common in Oregon and Washington Territory. At Fort Steilacoom

and at Fort Dalles, as early as February, occasional stragglers are seen. In March and April the main body of individuals arrive from their winter retreats, and during the breeding season and summer are found abundantly at both places.

The notes of this at times resemble those of the eastern species. A young individual that I obtained at Fort Steilacoom during the summer of 1856 showed the immature maculated coloration of the plumage very finely. The feathers of the breast were dusky ferruginous, having each a paler streak along the middle.

Excepting one or two stragglers I saw none of this species during the winter months, but, like their eastern representatives, they are among the earliest harbingers of spring. In the autumn of 1854 I noticed, at Fort Dalles, a flock of these birds which had apparently assembled with the view of migrating southward. They shortly afterwards all disappeared, and I saw no others till about the 1st of the following March.—S.

Sub-Family REGULINAE.—The Crowned Wrens.

REGULUS CALENDULA, Licht.

Ruby-crowned Wren.

Motacilla calendula, LANN. Syst. Nat. I, 1766, 337.—FORSTER, Phil. Trans. LXII, 1772, 383.—GMELIN, Syst. Nat. I, 1788, 994.

Sylvia calendula, LATHAM, Ind. Orn. II, 1790, 549.—WILSON, Am. Orn. I, 1808, 83; pl. v, f. 3.—DOUGHTY, Cab. N. H. II, 1832, 61; pl. vi.

Regulus calendula, LICHT. Verzeich. 1823, Nos. 408-'9.—NUTTALL, Man. I, 1832, 415.—AUDUBON, Orn. Biog. II, 1834, 546; pl. 195.—IB. Birds Amer. II, 1841, 168; pl. 133.—BAIRD, Gen. Rep. Birds, 226.

Reguloides calendula, BONAP. Conspectus, 1850, 292.

SP. CH.—Above dark greenish olive, passing into bright olive green on the rump and outer edges of the wings and tail. Crown with a large concealed patch of scarlet feathers, which are white at the base. The under parts are grayish white, tinged with pale olive yellow, especially behind. A ring round the eye, two bands on the wing coverts, and the exterior of the inner tertials white. Young without the red on the crown. Length, 4 to 4.38; extent, 6 to 7.25; wing, 2.33; tail, 1.85. Iris, bill, and feet, brown; toes, yellow.

HAB.—United States from Atlantic to Pacific.

The ruby-crowned wren associates with the golden-crowned in winter along the coast, and has their similar habits. I have not seen it during summer.—C.

This bird does not appear to be a constant winter resident of Washington Territory. The first specimen I obtained was on April 8, 1856, when it seemed to have just arrived from the south. A short time afterwards it became quite plentiful, and continued so until about May 20, when the species appeared to have either retired to the depths of the forests, or else to have gone further north. After that time only a few stragglers were seen.—S.

REGULUS SATRAPA, Licht.

Golden-crested Wren.

Regulus satrapa, LICHTENSTEIN, Verzeich. Doubl. 1823, No. 410. (Quotes *Parus satrapa*, Illiger, probably a museum name.)—BONAP. List, 1838.—IB. Conspectus, 1850, 291.—AUD. Synopsis, 1839, 82.—IB. Birds Amer. II, 1841, 165; pl. 132.—BAIRD, Gen. Rep. Birds, 227.

Sylvia regulus.—WILSON, Am. Orn. I, 1808, 126; pl. viii, f. 2. (Not of Latham.)

Regulus cristatus, VIEILLLOT, Ois. Am. Sept. II, 1807, 50; pl. cvi. (Not of Ray.) BONAP. Obs. Wilson, 1825.—IB. Synopsis, 1828, 91.

Regulus tricolor, NUTTALL, Man. I, 1832, 420.—AUD. Orn. Biog. II, 1834, 476; pl. 183.

SP. CH.—Above olive green, brightest on the outer edges of the wing; tail feathers tinged with brownish gray towards the head. Forehead, a line over the eye and a space beneath it, white. Exterior of the crown before and laterally black,

embracing a central patch of orange red, encircled by gamboge yellow. A dusky space around the eye. Wing coverts with two yellowish white bands, the posterior covering a similar band on the quills, succeeded by a broad dusky one. Under parts dull whitish. Length, under 4 inches to 4.25; extent, 6.25; wing, 2.25; tail, 1.80.

Hab.—Northern parts of United States from Atlantic to Pacific; on west coast only noticed on Puget Sound.

The golden-crowned wren is an abundant bird in the forests, especially during winter, and some remain all summer, as I have seen them feeding their young in August at Puget Sound. I have not met with its nest, nor have I heard its song. Its usual note was merely a chirp.—C.

The golden-crested wren is an abundant bird during the winter in the dense forests in the vicinity of Puget Sound. On almost any fine day at that season small groups of these active little creatures can be found industriously seeking their subsistence in the tops of the tall deciduous forest trees of the river bottoms. I have occasionally also seen them in the ever-greens.

Some stay during the summer and breed, while the greater number probably repair to the more northern portions of the continent, or else to the dense wilderness of the Cascade mountains.—S.

Sub-Family CINCLINAE.—The Ouzels.

HYDROBATA MEXICANA, Baird.

American Dipper; Water Ouzel.

Cinclus pallasii, BONAP. Zool. Jour. II, Jan. 1827, 52.—IB. Amer. Orn. II, 1828, 173; pl. xvi, f. 1; (not the Asiatic *pallasii*.)

Cinclus mexicanus, SWAINSON, Syn. Mex. Birds, in Phil. Mag. I, May, 1827, 368.

Cinclus americanus, SW. & RICH. F. Bor. Am. II, 1831, 173.—NUTTALL, Man. II, 1834, 569.—AUD. Orn. Biog. IV, 1838, 493; V, 1839, 303; pl. 370, 435.—IB. Synopsis, 1839, 86.—IB. Birds Amer. II, 1841, 182; pl. 137.—NEWBERRY, Zool. Cal. & Or. Route, 80; Rep. P. R. R. Surv. VI, iv, 1857.

Cinclus unicolor, BONAP. List, 1838.

Cinclus mortoni, TOWNSEND, Narrative, 1839, 337.

Cinclus townsendii, "AUDUBON," TOWNSEND, Narr. 1839, 340.

Hydrobata mexicana, BAIRD, Gen. Rep. Birds, p. 229.

SP. CH.—Above dark plumbeous, beneath paler; head and neck all round a shade of clove or perhaps a light sooty brown; less conspicuous beneath. A concealed spot of white above the anterior corner of the eye and indications of the same sometimes on the lower eyelid. Immature specimens usually with the feathers beneath edged with grayish white; the greater wing coverts and lesser quills tipped with the same. The colors more uniform. Length, 7.50; wing, 3.00; tail, 2.55.

Hab.—Rocky mountains from British America to Mexico.

I first noticed the water ouzel on the upper branches of the Columbia near the boundary line. I have also seen them a few times on streams near its mouth, and at Olympia, Puget Sound. On the 5th July I found a nest of this bird at a saw mill down on the Chehalis river. It was built under the shelving roots of an immense arbor-vitæ, which had floated over and rested in a slanting position against the dam. The floor was made of small twigs and bare, the sides and roof arching over it like an oven, and formed of moss projecting above so as to shelter the opening. This was large enough to admit the hand, and the inside very capacious. It contained half-fledged young. The old birds were familiar and fearless, being accustomed to the noise of the mill and the society of the men, who were much interested by their curious habits. They had already raised a brood in the same nest that summer.—C.

I obtained several specimens of this bird in the Rocky mountains, upon the streams of which it is very abundant. In habits it agrees remarkably with those described by Prince C. Lucien Bonaparte as belonging to the European species. It uses its wings like the *divers* while under

water, and appears to be equally at home either on the surface or under. One curious fact I noticed in regard to this bird is, that I frequently saw them *singly* or in *couples*, but never more than two together. In fact, they seem to prefer solitude, and eschew all sociable communion, or the slightest attempt at gregarious life, except the indispensable union of a pair for the purpose of procreation.

I never saw this bird on or near still water. They prefer and delight in wild mountain streams, where, among cascades, eddies, and swift currents, they lead their curious lives.

George Gibbs, esq., in a letter to me, mentions seeing this bird at Bellingham bay, and also says: "The bird described by Nuttall as the American water ouzel was common on the Salmon river, which is a rapid, brawling stream. As I sat at my cradle on the bank, a pair of them, which I suppose had their nests hard by, or perhaps, as it was July or August, had already hatched their brood, used to play in the water near me, sometimes alighting at the head of a rapid, allowing themselves to be swept under, and then rising below. They dive with great celerity, and at times beat the water with their wings, throwing the spray over themselves. Their whistle was sweet and rather sad, but they seemed very happy and busy fellows notwithstanding, and in no wise afraid of the harsh rattle of the miner's cradle."

It is not uncommon on the small streams about Puget Sound, but still not so numerous as in the Rocky mountains.—S.

Family SYLVICOLIDAE.—The Warblers.

Sub-Family MOTACILLINAE.—The Wagtails.

ANTHUS LUDOVICIANUS, Licht.

American Tit Lark.

Alauda ludoviciana, GMELIN, Syst. Nat. I, 1788, 793.

Anthus ludovicianus, LICHT. VERZ. 1823, 37, no. 421.—RICH. List, 1837.—BONAP. List, 1838.—IB. Conspectus, 1850, 249.—AUDUBON, Synopsis, 1839, 94.—IB. Birds Amer. III, 1841, 40; pl. 150.

Alauda rufa, WILSON, Am. Orn. V, 1812, 89; pl. lxxxix.

Anthus spinoletta, BONAP. Synopsis, 1828, 90, (not of Linnaeus.)—AUD. Orn. Biog. I, 1832, 408: V, 1839, 449; pl. 80.—NUTTALL, Man. I, 1832, 450.

Anthus aquaticus, AUD. Name on Pl. x, folioed.

Anthus pipieus, AUD. Orn. Biog. I, 1832, 408: V, 1839, 449; pl. 80. (Young?)

"*Anthus ludovicianus*, LICHT." BAIRD, Gen. Rep. Birds, p. 232.

SP. CH.—(Female, in spring.) Above olive brown, each feather slightly darker towards the central portion; beneath pale dull buff, or yellowish brown, with a maxillary series of dark brown spots and streaks across the breast and along sides. Ring round the eye, and superciliary stripe yellowish. Central tail feathers like the back, others dark blackish brown; the external one white, except at the base within; a white spot at the end of the second. Primaries edged with whitish, other quills with pale brownish. Length, 6 to 6.50; extent, 10½ to 11; wing, 3.45; tail, 2.95. Iris, dark brown; bill, yellow and black; feet, brown.

Hab.—North America generally. Greenland, (Reinhardt.) Accidental in Europe.

The American tit lark is abundant on the prairies of the Territory during winter, and, probably, breeds on the mountains. In September it arrives on the prairies along the coast in large flocks, and remains until May; but I believe none are found there during summer.—C.

Found by me in St. Mary's valley, Washington Territory.—S.

Sub-Family SYLVICOLINAE. The Wood Warblers.

GEOTHYLPIS TRICHAS, Cabanis.

Maryland Yellow-throat.

Turdus trichas, LINN. Syst. Nat. I, 1766, 293.—GMELIN, Syst. Nat. I, 1788.

Sylvia trichas, LATHAM, Ind. Orn. II, 1790.—VIEILLLOT, Ois. Am. Sept. II, 1807, 28; pl. xxviii & xxix.—AUD. Orn. Biog. I, 1832, 120: V, 1838, 463, pl. 23 & 240.

Geothlypis trichas, CABANIS, Mus. Hein. 1850, 16.—BAIRD, Gen. Rep., Birds, p. 241.

Sylvia marilandica, WILSON, Am. Orn. I, 1808, 88; pl. vi, f. 1.

Trichas marilandica, BON. List, 1838.—IB. Consp., 1850, 310.—AUD. Syn. 1839, 65.—IB. Orn. Biog. II, 1841, 78; pl. 102.

Sylvia roscoe, AUD. Orn. Biog. I, 1832, 124; pl. 24. (Young male.)

Trichas roscoe, NUTTAL, Man. I, 2d ed. 1840, 457.

SP. CH.—Upper parts olive green, tinged with brown towards the middle of the crown; chin, throat, and breast as far as the middle of the body, with the under tail coverts bright yellow. Belly dull whitish buff. Sides of body strongly tinged with light olive brown; under coverts glossed with the same. A band of black on the forehead, (about .20 of an inch wide in the middle,) passing backwards so as to cover the cheek and ear coverts, and extending a little above the eye; this band bordered behind by a suffusion of hoary ash, forming a distinct line above the eye, and widening behind the ear coverts into a larger patch, with a yellow tinge. In winter dress, and in the female, without the black mask, the forehead tinged with brown, the yellow of the throat less extended, the eyelids whitish, and an indistinct superciliary line yellowish. Length of male, 4.80 to 5.50; extent, 6.75; wing, 2.40; tail, 2.20. Bill black, iris brown, feet pale brown.

Hab.—North America from Atlantic to Pacific.

The Maryland yellow-throat is very common in the Territory during summer, preferring, as usual, the bushes along brooks and swamps. I observed its arrival about the first of April, and it remains until September.—C.

I have obtained several specimens of this bird at Fort Steilacoom, in the neighborhood of which they are always summer residents, but not in such numbers as the next species.—S.

GEOTHYLPIS MACGILLIVRAYI, Baird.

Macgillivray's Warbler.

Sylvia macgillivrayi, AUDUBON, Orn. Bio. V, 1839, 75; pl. 399. (*Sylvia philadelphia* on plate.)

Trichas macgillivrayi, AUD. Syn. 1839, 64.—IB. Birds Amer. II, 1841, 74; pl. 100.

Sylvia tolmiei, TOWNSEND, J. A. N. Sc. VIII, 1839, 149, 159. (Read April, but the volume really not published till 1840.)

Sylvia tolmiei, TOWNSEND, Narrative, 1839, 343.

Trichas tolmiei, NUTTALL, Man. I, 2d ed., 1840, 460.

Geothlypis macgillivrayi, BAIRD, Gen. Rep. p. 244.

SP. CH.—Head and neck all round, throat and fore part of the breast, dark ash color; a narrow frontlet, loreal region and space round the eye (scarcely complete behind) black. The eyelids above and below the eye (not in a continuous ring) white. The feathers of the chin, throat, and fore breast really black, with ashy gray tips, more or less concealing the black. Rest of upper parts dark olive green, (sides under the wings paler;) of lower, bright yellow. Female with the throat paler and without any black. Length of male, 5 to 5.75 inches; extent, 7.25 to 8; wing, 2.45; tail, 2.45; iris and feet brown, bill black above, white below.

Hab.—Pacific coast of North America, south to Gulf of California and across to Monterey, Mexico. In Rocky mountains to Fort Laramie.—(Dr. COOPER.)

This western yellow-throat is very common about Puget Sound, and, unlike the last, frequents the underbrush in the dry woods, keeping commonly close to the ground, but occasionally singing from a low tree a song somewhat similar to that of the above species. Its nest I

found built in a small bush not more than a foot above the ground, and very loosely built of straws with but little soft lining. The eggs, laid in June, were white. The young resemble the parents, but want the gray on the head and neck, those parts being greenish above and pale yellow below. I believe the gray of the head and neck soon wears off in the adult, as they look faded and greenish after June. I have since found it common in August as far east as Fort Laramie, Nebraska Territory.—C.

This bird is very abundant between the Cascade mountains and the Pacific coast. In habit it resembles others of the group, and is generally found among bushes and thickets. Dr. Townsend, who first described the species, named it in honor of William Frazer Tolmie, M. D., at that time surgeon to the honorable Hudson Bay Company, and now a chief factor in the same corporation. During my residence in Washington Territory, as a neighbor to Dr. Townsend, I was frequently under obligations to him for curious and rare specimens in different branches of natural history, for many professional favors, and for oft repeated kind hospitality, which was all the more agreeable because seasoned with the discourse of the highly educated intelligent gentleman—mine host.

A specimen obtained by me at Fort Steilacoom had the bill dusky above, paler below; legs *pale* flesh color inclined to dusky. In these characters they differ slightly from those recorded in the specific character given above, which are from specimens obtained by Dr. Cooper.

These, as well as the other ground warblers, seem to be entirely insectivorous, all the stomachs which I have examined containing fragments of coleoptera and other insects.

They are not a very shy species, but as they frequent thick brush and heavily leaved thickets, behind the foliage of which they are so thoroughly secreted, it is frequently difficult to obtain them.—S.

HELMINTHOPHAGA CELATA, Baird.

Orange-crowned Warbler.

Sylvia celata, SAY, Long's Exped. R. Mts. I, 1823, 169.—BONAP. Am. Orn. I, 1825, 45; pl. v, f. 2.—BON. Syn, 1828, 38.—NUTTALL, Man. I, 1832, 413, (*Dacnis*).—AUD. Orn. Biog. II, 1834, 449; pl. 178.

Sylvicola celata, RICH. List, 1837.

Vermivora celata, (JARDINE,) BONAP. List, 1838.

Helinaia celata, AUD. Syn. 1839, 69.—IB. Birds Am. II, 1841, 100; pl. 112.

Helmitheros celata, BONAP. Conspectus, 1850, 315.—BAIRD, Gen. Rep., p. 257.

SP. CH.—Above olive green, rather brighter on the rump. Beneath entirely greenish yellow, except a little whitish about the anus; the sides tinged with olivaceous. A concealed patch of pale brownish orange on the crown, hidden by the olivaceous tips to the feathers. Eyelids and an obscure superciliary line yellowish, a dusky obscure streak through the eye. No white spots on wings or tail of female, with little or none of the orange on the crown. Length, 4.70 to 5; extent, 7 to 7.50; wing, 2.25; tail, 2.00.

Hab.—Mississippi river to the Pacific; south to northern Mexico.

The orange-crowned warbler is very abundant in the vicinity of Fort Steilacoom. One also obtained at Fort Dalles, O. T.

Habits much like those of the ground warbler. They keep in shady places among thick brush, generally near water courses.—S.

DENDROICA OCCIDENTALIS, Baird.

Western Warbler.

Sylvia occidentalis, TOWNSEND, J. A. N. Sc. VII, II, 1837, 190.—IB. Narrative, 1839, 340.—AUDUBON, Orn. Biog. V, 1839, 55; pl. 55.

Sylvicola occidentalis, BONAP. List, 1838.—IB. Consp. 1850, 308.—AUD. Syn. 1839, 60.—IB. Birds Am. II, 1841, 60; pl. 93.

Mniotilta occidentalis, GRAY, Genera.

Dendroica occidentalis, BAIRD, Gen. Rep. Birds, p. 268.

SP. CH.—Crown, with sides of the head and neck, continuous bright yellow, feathers of the former edged narrowly with black; rest of upper parts dark brown, edged with bluish gray, so much so on the back and rump feathers as to obscure the brown, and with an olivaceous shade. Chin, throat, and fore part of breast, (ending convexly behind in a sub-crescentic outline,) black; rest of under parts white, faintly streaked on the sides with black. Two white bands on the wing, two outer tail feathers, and the terminal portion of a third, white, the shafts, and an internal streak towards the end, dark brown. Bill jet black. Length, 5.75; extent, 8; wing, 2.75.

Hab.—Pacific coast.

I obtained two specimens of this bird in June, 1856, at Fort Steilacoom. They are a shy bird, feeding and spending most of the time in the tops of the highest fir trees, thus rendering it exceedingly difficult to reach them with fine shot. Unfortunately, both of my specimens were lost while being sent to Washington City. They therefore were not examined by Professor Baird while making up the general report.

The specimens I obtained both differed in their measurements from those of the bird obtained by Mr. Samuels in California. The color of the legs differed from that included in the list of specific characters given by Professor Baird.

Specimen No. 392 of my collection, a male, killed June 14, 1856, at Fort Steilacoom, measured 5.75—8—2.75.

Iris hazel, bill black, legs greyish black. This bird, in plumage, agreed exactly with that described by Nuttall.

Another, marked 449, also a male, measured 5.50—8.12.

I do not think that this species is rare on the Pacific coast; but from the inaccessible nature of its favorite resorts it will be a long time before enough are obtained to make it common in cabinets of natural history.—S.

DENDROICA TOWNSENDII, Baird.

Sylvia townsendii, ("NUTTALL,") TOWNSEND, J. A. N. Sc. Ph. VII, II, 1837, 191.—IB. Narrative, 1839, 341.—AUD. Orn. Biog. V. 1839, 36; pl. 393.

Sylvicola townsendii, BONAP. List, 1838.—IB. Consp. 1850, 308.—AUD. Syn. 1839, 59.—IB. Birds Am. II, 1841, 59; pl. 92.—NUTTALL, Man. I, 2d ed. 1840, 446.

Dendroica townsendii, BAIRD, Gen. Rep. Birds, p. 269.

I saw on December 20, 1854, at Shoalwater bay, a warbler, in company with a flock of titmice and other small birds, which, I have no doubt, was that named by Audubon in honor of Townsend, its discoverer. Nuttall speaks of it as early a passenger through Oregon on its way northward, and as frequenting only the summits of the trees. It may, therefore, winter in the Territory in small numbers, and probably mostly in the interior. In November, 1855, I saw a small flock of this species in California, frequenting the willows in a wet low meadow, and obtained a pair.—C.

Mr. Philip Lutley Sclater, of London, has several excellent specimens of *Sylvicola townsendii*, obtained from the west coast of Central America. It probably extends in summer as far north as Russian America, thus having a very extended range along the Pacific coast. In Oregon, according to Mr. Townsend, it frequents the almost inaccessible tops of the Douglas fir, from whence it is very difficult to be obtained. It probably has many habits in common with the preceding species.—S.

DENDROICA NIGRESCENS, Baird.

Black-throated Gray Warbler.

Sylvia nigrescens, TOWNSEND, J. A. N. Sc. Ph. VII, II, 1837, 191.—IB. Narrative, 1839, 341.—AUD. Orn. Biog. V, 1839, 57; pl. 395.

Vermivora nigrescens, BONAP. List, 1838.—NUTTALL, Man. I, 2d ed. 1840, 471.

Sylvicola nigrescens, AUD. Syn. 1839, 60.—IB. Birds Amer. II, 1841, 62; pl. 94.—BONAP. Consp. 1850, 308.

Rhimanphus nigrescens, CAB. Mus. Hein. 1850, 20.

Dendroica nigrescens, BAIRD, Gen. Rep. Birds, p. 270.

SP. CH.—Head all round, fore part of the breast, and streaks on the side of the body, black; rest of under parts, a stripe on the side of the head, beginning acutely just above the middle of the eye, and another parallel to it, beginning at the base of the under jaw (the stripes of opposite sides confluent on the chin) and running further back, white. A yellow spot in front of the eye. Rest of upper parts bluish gray. The interscapular region and upper tail coverts streaked with black. Wing coverts black, with two narrow white bands; quills and tail feathers brown, the two outer of the latter white, with the shafts and a terminal streak brown; the third brown, with a terminal narrow white streak. Bill black; feet brown; iris brown. Length, 5.25 to 6.38; extent, 7.75; wing, 2.30; tail, 2.10.

Hab.—Pacific coast of United States; Fort Thorn, New Mexico.

Moderately abundant near Fort Steilacoom. Generally found on oak trees. Habits much like those of the *D. Audubonii*. It generally arrives from the south about the first week in April.—S.

I only saw one pair of the dusky warbler at Puget Sound, which seemed to have a nest, though I sought for it in vain. Townsend found it "abundant in the forests of the Columbia."—(Nutt.) Its song is faint and unvaried.—C.

DENDROICA CORONATA, Gray.

Yellow-rumped Warbler.

Motacilla coronata, LINNAEUS, Syst. Nat. I, 1766, 333.—GMELIN, Syst. Nat. I, 1788, 974, (male.)

Sylvia coronata, LATHAM, Index. Orn. II, 1790, 538.—VIEILLOT, Ois. Am. Sept. II, 1807, 24; pl. lxxviii, lxxix.—

WILSON, Am. Orn. II, 1810, 138; pl. xvii, f. 4, (summer)—II, 356; pl. xlv, f. 3, (winter).—

NUTTALL, Man. I, 1832, 361.—AUD. Orn. Biog. II, 1834, 303; pl. cliii.

Sylvicola coronata, SWAINSON, F. Bor. Am. II, 1831, 216.—BONAP. List, 1838.—IB. Conspectus, 1850, 307.—AUD.

Synop. 1839, 76.—IB. Birds Amer. II, 1841, 23; pl. lxxvi.

Dendroica coronata, G. R. GRAY, Genera, 2d ed. Suppl. 1842, 8.—BAIRD, Gen. Rep. Birds, p. 272.

SP. CH.—Above bluish ash, streaked with black. Under parts white. The fore part of breast and the sides black, the feathers mostly edged with white. Crown, rump, and sides of breast yellow. Cheeks and lores black. The eyelids and a superciliary stripe, two bands on the wing and spots on the outer three tail feathers, white. Female of duller plumage and browner above. Length, 5.65; extent, 9.25; wing, 3.00; tail, 2.50; iris brown; bill and feet black.

Hab.—Eastern North America to the Missouri plains. Stragglers seen on Puget Sound.

On the 1st of May, 1856, I obtained a bird, which, according to the description in Audubon's synopsis, appeared to belong to the present species, the "white throat" being present. In all other respects this bird resembled the *S. Audubonii*. It was shot in the same situation frequented by birds of the latter species, and its habits appeared identical.—S.

I saw, on Whidby's island, in April, two of the yellow-crowned warbler, similar to the last, and noticing the distinguishing white color of the chin, besides other less prominent differences, I shot one. It seemed to agree exactly with the eastern bird, and is a curious but not the only instance of two so closely allied species being found in the same region. As these are the only ones I met with, it must be rare in the Territory. My specimen was unfortunately lost.—C.

DENDROICA AUDUBONII, Baird.

Audubon's Warbler.

Sylvia audubonii, TOWNSEND, J. A. N. Sc. Ph. VII, II, 1837 —IB. Narrative, 1839, 342. —AUD. Orn. Biog. V, 1839, 52; pl. 395.

Sylvicola audubonii, BONAP. List, 1838. —AUD. Syn. 1839, 52. —IB. Birds Amer. II, 1841, 26; pl. 77.

Dendroica audubonii, BAIRD, Gen. Rep. Birds, p. 273.

SP. CH.—Above bluish ash, streaked with black, most marked on the middle of the back; on head and neck bluish ash. Middle of crown, rump, chin, and throat, and a patch on the side of the breast, gamboge yellow. Space beneath and anterior to the eyes, fore part of breast and sides, black; this color extending behind on the sides in streaks. Middle of belly, under tail coverts, a portion of upper and lower eyelids, and a broad band on the wings, with a spot on each of the four or five exterior tail feathers, white; rest of tail feathers black. Female brown above; the other markings less conspicuous and less black. Length, 5.75; extent, 9.25; wings, 3.20; tail, 2.25. Female smaller; iris brown; bill and feet black.

Hab.—Pacific coast of United States to central Rocky mountains. South to Mexico.

Audubon's warbler is the most abundant species in the Territory, and probably is a constant resident in the mild winters, as I noticed them abundant at the Straits of De Fuca as early as March 17. Its lively song is heard everywhere on the borders of woods, even on the coast, where few of these small species visit. I never could discover the nest, which is probably built high in the branches of the evergreens which it frequents in summer. In fall the straggling flocks of young birds wander about shrubby places in large numbers, making no sound but a sharp chirping call.—C.

This is the most abundant wood-warbler found in the western section of Washington Territory. I have procured many specimens, both for the Smithsonian Institution and for private exchanges. In the vicinity of Fort Steilacoom this bird is found, principally in the oak trees (*Q. Garryana*) on the Nisqually plains. In the spring it arrives a little earlier than the other warblers. In the spring of 1856 I obtained the first of that season about March 20. The young are generally able to fly by June 25.—S.

DENDROICA AESTIVA, Baird.

Yellow Warbler.

Motacilla aestiva, GMELIN, Syst. Nat. I, 1788, 996.

Sylvia aestiva, LATHAM, Index Orn. II, 1790, 551. —VIEILLOT, Ois. Am. Sept. II, 1807, 35; pl. xcv. —BONAP. Obs. Wils. 1826, No. 144. —AUD. Orn. Biog. I, 1831, 476; pl. 95, 35. —NUTT. Man. I, 1832, 370.

Sylvicola aestiva, SWAINSON, F. Bor. Am. II, 1831, 211. —BONAP. List, 1838. —AUD. Syn. 1839, 57. —IB. Birds Amer. II, 1841, 50; pl. 88.

Rhimamphus aestivus, BONAP. Censp. 1850, 311. —CABANIS, Mus. Hein. 1851, 19. —IB. Journ. Orn. III, 1855, 472, (Cuba.)

Sylvia citrinella, WILSON, Am. Orn. II, 1810, 111; pl. xv. f. 5.

Sylvia childreni, AUD. Orn. Biog. I, 1831, 180; pl. 35. (Immature.)

? *Sylvia rathbonia*, AUD. Orn. Biog. I, 1831, 333; pl. 65.

? *Sylvicola rathbonia*, AUD. Syn. 1839, 58. —IB. Birds Amer. II, 1841, 53; pl. 89.

? *Motacilla petechia*, LINN. Syst. Nat. I, 1766, 334. —GMELIN, I, 1788, 983.

Dendroica aestiva, BAIRD, Gen. Rep. Birds, p. 282.

SP. CH.—Bill lead color. Head all round, and under parts generally bright yellow; rest of upper parts yellow olivaceous, brightest on the rump. Back with obsolete streaks of dusky reddish brown. Fore breast and sides of the body streaked with brownish red. Tail feathers bright yellow; the outer webs and tips, with the whole upper surfaces of the innermost one, brown; extreme outer edges of wing and tail feathers olivaceous, like the back; the middle and greater coverts and tertials edged with yellow, forming two bands on the wings. Female similar, with the crown olivaceous, like the back, and the streaks wanting on the back, and much restricted on the under parts. Tail with more brown. Iris brown. Feet dingy flesh color. Length of male, 5.25; extent, 7.75; wing, 2.66; tail, 2.25. (940.)

Hab.—United States from Atlantic to Pacific; south to Guatemala and West Indies.

The summer yellow bird is abundant in this Territory, having the same habits and song as in the eastern States. I noticed their arrival in large numbers at the Straits of De Fuca as early as April 8. Its nest is built in a bush but a few feet from the ground, formed of fibres of roots, bark, &c., and the eggs, about five in number, are white, sprinkled with spots near the larger end.—C.

This bird is abundant among the scrub oaks, thickets, and bushes on the Nisqually plains. The late moult commences early in August May 3, 1856, Fort Steilacoom, Washington Territory. Specimen 359. Bill, grayish blue; legs, pale.—S.

MYIODIOCTES PUSILLUS, Bonap.

Green Black-cap Flycatcher.

Muscicapa pusilla, WILSON, Am. Orn. III, 1811, 103; pl. xxvi, f. 4.

Wilsonia pusilla, BONAP. List, 1838.

Sylvania pusilla, NUTTALL, Man. I, 2d ed. 1840, 335.

Myiodiocytes pusillus, BONAP. Conspectus, 1850, 315.—BAIRD, Gen. Rep. Birds, p. 293.

Sylvia wilsonii, BONAP. Obs. Wilson, 1826, No. 127.—NUTTALL, Man. I, 1832, 408.

Muscicapa wilsonii, AUD. Orn. Biog. II, 1834, 148; pl. 124.

Myiodiocytes wilsonii, AUD. Syn. 1839, 50.—IB. Birds Am. II, 1841, 21; pl. 75.

SP. CH.—Forehead, line over and around the eye, and under parts generally bright yellow. Upper part, olive green; a square patch on the crown lustrous black. Sides of body and cheek tinged with olive. No white on wings or tail. Female similar; the black of the crown obscured by olive green.

Length, 4.75 to 6; extent, 5.25 to 8.75?; wing, 2.25; tail, 2.30.

Hab.—United States from Atlantic to Pacific; south to Guatemala.

This bird is very abundant in the neighborhood of Fort Steilacoom, frequenting thickets and small scrub oak groves. In habits it much resembles the *Helminthophaga celata*, flitting about among the dense foliage of bushes and low trees in a busy restless manner, like the "little joker," "now you see him, now you don't." Its cry is a short chit-chat call.—S.

I have seen two or three times on the coast a yellow warbler with a black crown, which was probably Wilson's flycatcher, found by Nuttall in Oregon. I only noticed them in spring and fall.—C.

Sub-Family TANAGRINAE—The Tanagers.

PYRANGA LUDOVICIANA, Bonap.

Louisiana Tanager.

Tanagra ludoviciana, WILSON, Am. Orn. III, 1811, 27; pl. xx, f. 1.—BON. Obs. 1826, 95.—AUD. Orn. Biog. IV, 1838, 385; V, 1839, 90; pl. 354, 400.

Tanagra (Pyranga) ludoviciana, BONAP. Syn. 1828, 105.—NUTTALL, Man. I, 1832, 471.

Pyranga ludoviciana, RICH. List, 1837.—BONAP. List, 1838.—AUD. Syn. 1839, 137.—IB. Birds Amer. III, 1841, 211; pl. 210.—SCLATER, Pr. Zool. Soc. 1856, 125.—BAIRD, Gen. Rep. Birds, p. 303.

SP. CH.—Bill shorter than the head. Tail slightly forked; first three quills nearly equal. Male, yellow; the middle of the back, the wings, and the tail, black. Head and neck all round strongly tinged with red; least so on the sides. A band of yellow across the middle coverts, and of yellowish white across the greater ones; the tertials more or less edged with whitish. Female, olive green above, yellowish beneath; the feathers of the interscapular region dusky, margined with olive. The wings and tail rather dark brown, the former with the same marks as the male. Length, 7.25; wing, 3.60; tail, 2.85. Legs and feet dusky lead color; bill pale dusky green, darker on the ridge and at the base.

Hab.—From the Black Hills to the Pacific; south to Mexico.

This beautiful tanager arrives at Puget Sound about May 15, and is a common summer resident in the Territory, especially near river banks and prairies where deciduous trees grow. Its song much resembles that of the black-winged red-bird, being of a few notes only, rather faintly whistled in the manner of the robin, and often sounding as if the bird was distant when it is quite near. I never could discover the nest of this bird, which is said to be built high in an evergreen tree. Its range is, doubtless, throughout the Territory, as I have shot it east of the Rocky mountains, and up to the 49th degree of latitude.—C.

The beautiful Louisiana tanager is quite abundant in certain seasons in the vicinity of Fort Steilacoom. In 1854 but a limited number made their appearance, while, on the contrary, in the summer of 1856 they were so abundant that I could readily have obtained a hundred specimens. I have had frequent opportunities of studying their habits, and have never yet seen them descend to the low bushes, or the ground, as stated by Nuttall, the reverse being the rule, (at least at Puget Sound ;) the difficulty being generally to find the bird sufficiently low down on fir tree branches to allow fine shot to reach it with any degree of certainty. The colors of the plumage of the male and female compare relatively much as do those of opposite sexes of the *Carpodacus purpureus*, or of the *Curvirostra americana*.

The favorite habitat of the species, in those localities where I have observed them, is among the tall red fir trees belonging to that magnificent species the *Abies douglassii*. They seemingly prefer the edges of the forest, rarely retiring to its depths unless for concealment when alarmed. In early summer, at Fort Steilacoom, they are generally seen during the middle of the day sunning themselves in the firs, occasionally darting from one of these trees to another, or to some of the neighboring white oaks (*Q. Garryana*) on the prairie. Later in the season they may be seen very actively flying about in quest of insect food for their young. On the 10th of July, 1856, I saw one of these birds carrying a worm or insect in its month, from which I inferred that the young were then hatched out. Both sexes during the breeding season are much less shy, the males during the day time frequently sitting on some low limb, rendering the scene joyous with their delightful melody.

The bill of a specimen examined by me was quite sticky, as if smeared with the resinous exudation of their favorite firs. I opened the stomach of this bird and found it filled with insects, principally coleoptera. Among these I saw many fragments of the large green *Buprestis*, found generally on the Douglas fir trees. I saw no specimens of any other class of insects than coleoptra among the fragments, excepting *obscure* indications of wasps, or some other *Hymenoptera*.

NOTE.—I obtained a large number of females of this species, which were transmitted to Prof. Baird, but unfortunately lost. A more extended description of the ordinary plumage of birds of this sex than is contained in the description given in the General Report may be of interest.

SP. CH.—Beneath yellow, but not so bright as the male. Head and neck yellowish dusky green. Forehead slightly brighter than the crown. Back greenish dusky, tinged with grey; in some cases the back is of a plainer dusky, the admixture of grayish green not being so apparent. Throat, breast, vent, and lower tail coverts, bright yellow, inclining to white on the abdomen, and to ash on the sides. Two bars on the wings; one yellowish white, produced by the tips of the greater coverts of the secondaries; the other yellow and better defined, formed by the ends of the second row of lesser coverts. External margin of the tail feathers greenish.—S.

Family HIRUNDINIDAE—The Swallows.

HIRUNDO HORREORUM, Barton.

Barn Swallow.

Hirundo horreorum, BARTON, Fragments N. H. Penna. 1799, 17.—BAIRD, Gen. Rep. Birds, p. 308.

Hirundo rufa, VIELLIOT, Ois. Am. Sept. I, 1807, 60; pl. xxx. (Not of Gmelin.)—CASSIN, Illust. I, 1855, 243.

BREWER, N. Am. Ool. I, 1857, 91; pl. v, f. 63—67, eggs.

Hirundo americana, WILSON, Am. Orn. V, 1812, 34; pl. xxxviii, f. 1, 2. (Not of Gmelin.)—RICH. F. B. A. 11, 1831, 329.

Hirundo rustica, AUDUBON, Orn. Biog. II, 1834, 413; pl. 173.—IB Syn. 1839, 35.—IB Birds Am. I, 1840, 181; pl. 48. (Not of Linnaeus.)

SP. CH.—Tail very deeply forked; outer feathers several inches longer than the inner, very narrow towards the end. Above glossy blue, with concealed white in the middle of the back. Throat chestnut; rest of lower part reddish white, not conspicuously different. A steel blue collar on the upper part of the breast, interrupted in the middle. Tail feathers with a white spot near the middle, on the inner web. Female with the outer tail feather not quite so long. Length, 6.90 inches; wing, 5; tail, 4.50.

Hab.—North America, from Atlantic to Pacific.

The barn swallow seems to be limited by the Columbia river, as I have seen none at Puget Sound, or other more northern places. Near the mouth of the river they built in large numbers in the high caverns formed by the sea in Cape Disappointment, and into which the tide flows, the base of the rock being exposed to the full force of the waves which break against it.

They had also lately begun to build under the eaves of houses.—C.

I saw nests of what I took to be this species of birds in caves and the hollows of cliffs near the Bear's Paw mountains, not far from Fort Benton, Nebraska.—S.

HIRUNDO LUNIFRONS, Say.

Cliff Swallow.

Hirundo lunifrons, SAY, Long's Exped. R. Mts. II, 1823, 47.—CASSIN, Illust. I, 1855, 243.—BREWER, N. Am. Ool. I, 1857, 94; pl. v. No. 68—73, egg.—BAIRD, Gen. Rep. Birds, p. 309.

Hirundo opifex, DEWITT CLINTON, Ann. N. Y. Lyc. I, 1824, 161.

Hirundo respublicana, AUDUBON, Ann. N. Y. Lyc. I, 1824, 164.

Hirundo fulva, BONAP. Am. Orn. I, 1825, 63; pl. ii. (Not of Vieillot.)—AUDUBON, Orn. Biog. I, 1831, 353; pl. 58.—IB Syn. 1839, 35.—IB Birds Am. I, 1840, 177; pl. 47.

SP. CH.—Crown and back steel blue; the upper part of the latter with concealed pale edges to the feathers. Chin, throat, and sides of the head dark chestnut; breast fuscous; belly white. A steel blue spot on throat. Rump light chestnut; forehead brownish white; a pale nuchal band. Tail slightly emarginate. Length about 5 inches; wing, 4.40; tail, 2.20.

Hab.—North America, from Atlantic to Pacific.

The cliff swallow seems to be rather scarce as yet north of the Columbia river. I saw none in the bare mountainous regions traversed in 1853, though apparently adapted to their habits. They were almost unknown about Puget Sound, though at Olympia I noticed a few flying about the streets in July, which had nests in some tall dead trees near the town. At Vancouver I saw none, though south of there, at Portland, only seven miles distant, they had many nests under the eaves of high buildings, and were common in all the towns of Oregon.

Nuttall mentions their building on the side of "Pillar rock," and there are many cliffs along the Columbia where they probably build. They may become more abundant with the increase of settlements, as in the eastern States.—C.

Moderately abundant about the basaltic cliffs near Fort Dalles, Oregon Territory, where it makes its appearance in the spring simultaneously with *H. bicolor* and *H. thalassina*, but is not so numerous found.—S.

HIRUNDO BICOLOR, Vieillot.

White-bellied Swallow.

Hirundo bicolor, VIEILLOT, Ois. Am. Sept. I, 1807, 61; pl. xxxi.—AUDUBON, Orn. Biog. 1831, 491; pl. 98.—IB. Syn. 1839, 35.—IB. Birds Amer. I, 1840, 175; pl. 46.—CASSIN, Illust. I, 1855, 244.—BREWER, N. Am. Oology, I, 1857, 100; pl. iv, fig. 47. (Egg.)—BAIRD, Gen. Rep. Birds, p. 310.

Herse bicolor, BONAP. Conspectus, 1850, 341.

Hirundo viridis, WILSON, Am. Orn. V, 1812, 49; pl. xxxviii.

Sp. Ch.—Glossy metallic green above; entirely white beneath. Female much duller in color.

Length, 6 to 6.25 inches; extent, 3.50; wing, 5.00; tail, 2.65. Iris and feet, brown; bill, black.

Hab.—North America, from Atlantic to Pacific.

The white-bellied swallow is another common species in the western portions of the Territory, building even along the damp and windy coast generally shunned by small land birds. It builds in hollow trees, and does not appear to seek the accommodations of a box or knot-hole in a building.—C.

Specimens of this bird, or of the California variety mentioned by Cassin, (vide synopsis,) were obtained by me both at Fort Steilacoom, W. T., and Fort Dalles. They arrive in the spring simultaneously with the *H. thalassina*. Although not nearly so plentiful as the latter species, they exceed in number the *H. lunifrons*.—S.

HIRUNDO THALASSINA, Swainson.

Violet-green Swallow.

Hirundo thalassina, SWAINSON, Taylor's Philos. Mag. I, 1827, 365.—AUD. Orn. Biog. IV, 1838, 597; pl. 385.—IB. Birds Am. I, 1840, 186; pl. 49.—CASSIN, Illust. I, 1855, 245.—BREWER, N. Am. Oology, I, 1857, 102; pl. v, f. 74. (Egg.)—BAIRD, Gen. Rep. Birds, p. 311.

Sp. Ch.—Tail acutely emarginate. Beneath pure white. Above soft velvety green, with a very faint shade of purplish violet concentrated on the nape into a transverse band. Rump rather more vivid green; tail coverts showing a good deal of purple. Colors of female much more obscure.

Length, 4.75 to 5; extent, 12.25; wing, 4.50; tail, 2. Male: length, 5; extent, 12½ inches. Iris, brown; feet, paler; bill, black.

Hab.—Rocky mountains to Pacific; south to Mexico; east to Saltillo, Mexico.

The brilliant little sea-green swallow arrives at Puget Sound early in May, with the other species, and frequents entirely the high prairies bordered with oaks and other deciduous trees. It builds in the knot-holes of these trees, or in deserted woodpecker's nests. It associates much with the next species, which has similar habits. Its song is varied and pleasing, but very weak. I have never seen it along the cooler coast.—C.

This beautiful swallow is abundant throughout the interior of Oregon and Washington Territories. I have observed it arrive at Puget Sound about the 10th of May, where it breeds and remains as a summer resident. The place chosen for its nest is generally a knot-hole in oak or other trees. In habits and mode of flight it scarcely differs from the other species of this genus.

S.

COTYLE SERRIPENNIS, Bonap.

Rough-winged Swallow.

Hirundo serripennis, AUD. Orn. Biog. IV, 1838, 593.—IB. Birds America, I, 1840, 193; pl. 51.

Cotyle serripennis, BONAP. Consp. 1850, 342.—CASSIN, Illust. I, 1855, 247.—BREWER, N. Am. Oology, I, 1857, 106, fig. 50, (egg.)—BAIRD, Gen. Rep. Birds, p. 313.

SP. CH.—Tail slightly emarginate; first primary with the pennulae of the outer web much stiffened, with their free extremities recurved into a hook very appreciable to the touch. No feathers on the tarsus and toes. Above rather light sooty brown, beneath whitish gray, or light brownish ash, becoming nearly pure white in the middle of the belly and on the under tail coverts. Length, 5.50; extent, 12.50; wing, 4.28; tail, 2.23. Iris, brown; bill and feet, black.

Hab.—United States, from Atlantic to Pacific.

The rough-winged swallow is common about the sandy cliffs of the bays and inlets of this coast. It arrives near the Columbia river in May, and remains until the middle of August, when, though in so mild a climate, all the swallows go southward, their last broods being still scarcely able to fly. This species burrows holes in soft, sandy banks near the tops of cliffs, and has the same habits as the bank swallow of the east. Their only notes are a few chirping calls.—C.

Rather abundant in both Oregon and Washington Territories. Several specimens were obtained by me and forwarded to the Smithsonian museum.—S.

PROGNE PURPUREA, Boie.

Purple Martin.

Hirundo purpurea, LINN. Syst. Nat. I, 1766, 344.—AUDUBON, Orn. Biog. I, 1831, 115; pl. xxiii.—IB. Birds Am. I, 1840, 170; pl. xlv.

Progne purpurea, BOIE, Isis, 1826, 971.—BONAP. List, 1838.—CASSIN, Illust. I, 1855, 245.—BREWER, N. Am. Oology, I, 1857, 103; pl. iv, fig. 47, (egg.)—BAIRD, Gen. Rep. Birds, p. 314.

Hirundo subis, LINNAEUS, Syst. Nat. I, 1766, 344, (second year.)

Hirundo violacea, GM. Syst. Nat. I, 1788, 1026.

SP. CH.—Largest of N. American swallows. Closed wings rather longer than the deeply forked tail. Tarsi and toes naked. Color, in the old male, everywhere glossy steel blue, with purple and violet reflections. Female and immature male less brilliant above, pale brownish beneath, blotched with darker or with bluish. Length, 7.30; wing, 5.85; tail, 3.40.

Hab.—North America generally.

On the 23d of May, 1856, I obtained at Fort Steilacoom, Washington Territory, a specimen of *Progne*, agreeing very well with a description of *P. purpurea*, with which I at the time compared it. Unfortunately the skin was lost, with a large and valuable consignment of northwestern birds, which was despatched from Fort Steilacoom to the Smithsonian, but never reached its destination. I was especially sorry to lose this bird, as I wished it to be compared with such specimens of *P. chalybea* (vide Cassin's description of this species) as were in the museums of the Philadelphia Academy and Smithsonian Institution.

My specimen measured 8.50 by 16.38. It is not a common bird in Washington Territory, and I was only able to obtain this one specimen, although I saw several others at odd times. They were then met with in groves of scrub-oaks on the Nisqually plains.—S.

I never saw this bird in the Territory, where it must be rare.—C.

Family BOMBYCILLIDAE. Waxwings.

AMPELIS CEDRORUM, Baird.

Cedar Bird.

Ampelis garrulus, Var. β , LINN. Syst. Nat. I, 1766, 297.—GM. I, 1788, 838.

Ampelis carolinensis, GOSSE, Birds Jamaica, 1847, 197.—BONAP. Consp. 1850, 336.

Bombycilla carolinensis, BRISSON, Orn. II, 1760, 337.—AUD. Orn. Biog. I, 1831, 227: V, 494; pl. 43.—IB. Syn. 1839, 165.—IB. Birds Amer. IV, 1842, 165; pl. 245.—WAGLER, Isis, 1831, 528.

Bombycilla cedrorum, VIEILLOT, Ois. Am. Sept. I, 1807, 88; pl. lvii.—IB. Galerie Ois. I, 1834, 186; pl. cxvii.

Ampelis americana, WILSON, Am. Orn. I, 1808, 107; pl. vii.

Ampelis cedrorum, BAIRD, Gen. Rep. Birds, p. 318.

SP. CH.—Head crested. General color reddish olive, passing anteriorly on the neck, head, and breast into purplish cinnamon; posteriorly on the upper parts into ash; on the lower into yellow. Under tail coverts white. Chin dark sooty black, fading insensibly into the ground color on the throat. Forehead, loreal region, space below the eye, and a line above it on the side of the head, intense black. Quills and tail dark plumbeous, passing behind into dusky; the tail tipped with yellow; the primaries, except the first, margined with hoary. A short maxillary stripe, a narrow crescent on the infero-posterior quarter of the eye, white. Secondaries with horny tips, like red sealing wax. Length, 7.25; wing, 4.05; tail, 2.60.

Hab.—North America generally; south to Guatemala.

The cedar bird is much less common than in the cultivated Atlantic States. I have only seen them in summer in pairs and small families, and suppose the greater part of those raised here retire to the more open regions southward in the fall. Their irregular migrations are probably induced by want of food.—C.

Townsend says that this bird is found in Oregon. I have never seen it west of the Rocky mountains, but on several occasions have thought that I recognized its notes, when the brush being so thick, or from some other circumstance, I was unable to obtain a glimpse of the bird. This was at Fort Dalles. I think the species does not visit Puget Sound at all. If it does, it must be very scarce in that vicinity, as all my efforts to obtain even a single specimen were fruitless.—S.

MYIADESTES TOWNSENDII, Cabanis.

Townsend's Flycatcher.

Ptiliogonys townsendii, AUD. Orn. Biog. V, May, 1839, 206; pl. 419, f. 2.—IB. Syn. 1839, 46.—IB. Birds Amer. I, 1840, 243; pl. 69.—TOWNSEND, Narrative, 1839, 338.—NUTTALL, Man. I, 2d ed. 1840, 361.—

GAMBEL, Pr. A. N. Sc. I, 1843, 261.

Culicivora townsendii, DEKAY, N. Y. Zool. II, 1844, 110.

Myiadestes townsendii, CABANIS, Wieg. Arch. 1847, I, 208.—BAIRD, Gen. Rep. Birds, p. 321.

? *Myiadestes unicolor*, SCLATER, Pr. Zool. Soc. 1856, 299; 1857, 5. (Is very closely allied. Cordova Mexico.)

SP. CH.—Tail rather deeply forked. Exposed portion of spurious quill less than one-third that of the second; fourth quill longest; second a little longer than the sixth. Head not crested. General color bluish ash, paler beneath; under wing coverts white. Quills with a brownish yellow bar at the base of both webs mostly concealed, but showing a little below the greater coverts and alulae; this succeeded by a bar of dusky, and next to it another of brownish yellow across the outer webs of the central quills only. Tertiaries tipped with white. Tail feathers dark brown; the middle ones more like the back; the lateral with the outer web and tip, the second with the tip only, white. A white ring round the eye.

Length, 8.75 inches; extent, 12.80; wing, 4.50; tail, 3.85. (8234.)

Hab.—United States, from Rocky mountains and Black Hills to the Pacific; south to the borders of Mexico.

I obtained a specimen of this bird near Fort Laramie, Nebraska, in October, when it was apparently not uncommon there, and had much the habits of the flycatchers.—C.

I was fortunate enough to secure a specimen at Fort Steilacoom, Washington Territory, on

the 28th of April, 1856. It was shot by my servant, who described it as being excessively wild and difficult to approach.

This is the only specimen of the species I have seen, and I consider it therefore accidental west of the Cascade mountains.—S.

Family LANIIDAE.—The Shrikes.

COLLYRIO BOREALIS, Baird.

Great Northern Shrike; Butcher Bird.

Lanius septentrionalis, BON. Syn. 1828, 72.—BON. List, 1838.—IB. Rev. et Mag. Zool. 1853, 294.—NUTTALL, Man. I, 1832, 258.—IB. I, 2d ed. 1840, 285. (Not of Gmelin.)

Lanius borealis, VIEILLOT, Ois. Am. Sep. I, 1807, 90; pl. I.—SW. F. B. Am. II, 1831, 111.—AUD. Syn. 1839, 157.—IB. Birds Amer. IV, 1842, 130; pl. 236.

Lanius excubitor, FORSTER, Phil. Trans. LXII, 1772, 382.—WILSON, I, 1808, 74; pl. v, f. 1.—BON. Obs. 1826.—AUD. Orn. Biog. II, 1834, 534; pl. 192.

Collyrio borealis, BAIRD, Gen. Rep. Birds, p. 324.

SP. CH.—Above light bluish ash, obscurely soiled with reddish brown. Forehead, sides of the crown, scapulars, and upper tail coverts hoary white. Beneath white, the breast with fine transverse lines. Wings and tail black; the former with a white patch at base of primaries and tips of small quills; the latter with the lateral feathers tipped with white. Bill blackish brown; considerably lighter at the base. Black stripe from the bill through and behind the eye, but beneath the latter interrupted by a whitish crescent. Female and young with the gray soiled with brownish. Length, 9.85; wings, 4.50; tail, 4.80; its graduation, .90.

Length, $10\frac{3}{4}$ inches; extent, $14\frac{1}{2}$ inches; feet, black; bill, brownish black.

Hab.—Northern regions, from Atlantic to Pacific; in winter south, through most of the United States.

The northern shrike is only a winter resident in the Territory, appearing along the coast in November and remaining until March. It frequents bushy places, and seems to live chiefly on insects. I never saw them attack small birds, though often in company with them.—C.

I obtained one specimen of this shrike at St. Mary's valley, Washington Territory, in 1853. As a group the butcher birds are but poorly represented in number in Oregon or Washington Territories.—S.

Sub-Family VIREONINAE.—The Greenlets.

VIREO GILVUS, Bonap.

Warbling Flycatcher.

Muscicapa gilva, VIEILLOT, Ois. I, 1807, 65; pl. xxxiv.

Vireo gilvus, BONAP. Obs. Wilson, 1825, No. 123.—NUTT. I, 1832, 309.—AUD. Orn. Biog. II, 1834: 114; V. 1839, 433; pl. 118.—IB. Birds Amer. IV, 1842, 149; pl. 241.—BAIRD, Gen. Rep. Birds, p. 335.

Muscicapa melodia, WILSON, Am. Orn. V, 1812, 85; pl. 42, fig. 2.

SP. CH.—Third, fourth, and fifth quills nearly equal; second and sixth usually about equal, and about .25 of an inch shorter than third; the exposed portion of spurious quill about one-fourth the third. Above greenish olive; the head and hind neck ashy, the back slightly tinged with the same. Lores dusky; a white streak from the base of the upper mandible above and a little behind the eye; beneath the eye whitish. Sides of the head pale yellowish brown. Beneath white, tinged with very pale yellow on the breast and sides. No light margins whatever on the outer webs of the wings or tail. Length about 5.50 inches; extent, 8.50; wings nearly 3. Spurious primary one-fourth the length of second. Iris, brown; feet, slate color; bill, brown.

Hab.—Atlantic to Pacific coast of the United States.

I did not notice the arrival of the warbling vireo, near Puget Sound, until about the middle of May, but it was quite common afterwards. Its song, more lively than in other species, was

generally heard at all hours of the day, from the top of the poplar, ash, and other deciduous trees, where it was always actively engaged in pursuing insects, even while singing; its song being frequently interrupted while it darted after one, began again as soon as it could swallow the victim.—C.

One specimen of this species I obtained at Fort Steilacoom, June 17, 1856. Upper mandible, dark dusky lead color; lower, pale bluish. Measurements, $5\frac{5}{8}$, $8\frac{3}{4}$. ♂.—S.

VIREO SOLITARIUS, Vieillot.

Blue-headed Flycatcher.

Muscicapa solitaria, WILSON, Am. Orn. II, 1810, 143; pl. 17, f. 6.

Vireo solitarius, VIEILL. NOUV. Dict. 1817. AUD. Orn. Biog. I, 1831, 147: V, 1839, 432; pl. 23.—IB. Syn. 1839.—

IB. Birds Amer. IV, 1842, 144; pl. 239.—NUTT. Man. I, 1832, 305.—BAIRD, Gen. Rep. Birds, p. 340.

SP. CH.—Spurious primary very small, not one-fourth the second, which is longer than the sixth. Top and sides of the head and upper part of neck dark bluish ash; rest of upper parts clear olive green. A white ring round the eye, interrupted in the anterior canthus by a dusky lore, but the white color extending above this spot to the base of the bill. Under parts white; the sides under the wings greenish yellow. Two bands on the wing coverts, with the edges of the secondaries, greenish white. Outer tail feather with its edge all round, including the whole outer web, whitish. Length, about 5.50 to 5.75 inches; extent, 9; wing, 2.40 to 3. Bill and feet, black; iris, brown.

Hab.—United States, from Atlantic to the north Pacific, (Washington Territory only?)

The solitary vireo is common in Washington Territory—arriving from the south in May, and frequenting chiefly the groves of oak in the interior. Its sweet and varied song is so closely imitated by the purple finch, that on one occasion, hearing both singing in the same tree, I could not distinguish any difference, and have no doubt that one had been attracted by the song of the other.—C.

This greenlet is rather common near Fort Steilacoom. In 1856 I obtained several specimens. Another killed at Fort Steilacoom measured 5.75; extent, 9.12; wing, 3. This and another specimen from the same locality differed from Nuttall's description of the species, in having the lower mandible scarcely lighter than the upper; also, the breasts were *not* "pale cinereous" but white, or white slightly tinged with yellowish. Throat *not* "tinged with greenish."—S.

Family LIOTRICHIDAE.

Sub-Family TROGLODYTINAE.—The Wrens.

THRIOTHORUS BEWICKII, Bonap.

Bewick's Wren.

Troglodytes bewickii, AUD. Orn. Biog. I, 1831, 96: V, 1838, 467; pl. 18.—IB. Syn. 1839, 74.—IB. Birds Amer. II, 1841, 120; pl. 118.—NUTT. Man. I, 1832, 434.—LESSON, Rev. Zool. 1840, 264.—NEWBERRY, Zool. P. R. B. Surv. VI, iv, 1857, 80.

Thryothorus bewickii, BONAP. List, 1838.—IB. Conspectus, 1850, 221.—BAIRD, Gen. Rep. Birds, p. 363.

Troglodytes spilurus, VIGORS, Zool. Beechey's Voyage, 1839, 18; pl. iv, f. 1. California.

SP. CH.—Bill shorter than the head. Tail longer than the wings; much graduated. Upper parts rufous brown; beneath plumbeous white. A white streak over the eye, the feathers edged above with brown. Exposed surface of the wings and the innermost tail feathers closely barred with dusky; the remaining tail feathers mostly black, barred or blotched with white at the tips, and on the whole outer web of the exterior feather, and on the under tail coverts. Length, 5.50; extent, 7; wing, 2.25; tail, 2.50. Iris, brown; legs, gray; bill, black; lower mandible, white.

Var. *spilurus*, with longer bill; purer white beneath. Colors more grayish olivaceous above.

Hab.—North America, from Atlantic to Pacific; south to Mexico.

Bewick's wren seems to be the representative of the Carolina wren in the west, having all its talent and variety of song, but I believe *never* mimicking other birds, though its notes may sometimes resemble their songs. I have often been led through dense thickets and swamps by this deceiving songster, expecting to find some new bird. This and the winter wren are among the few birds that enliven the long rainy season with their songs, which are as constantly heard in the dullest weather as in the sunny spring. I could never discover its nest, which is probably built in the hollow of a stump or log. Young broods appear as early as June 1.—C.

This wren is very abundant near Puget Sound. It is a constant resident throughout the year, and is not less abundant during winter. In January and February it is found on sunny days among low thickets and crabapple brush. Here, in company with the smaller species, *T. hyemalis* and *parkmanni*, it may be seen flitting about on the ground and among low branches in quest of food. At this season they are very tame, allowing a man to approach without suspicion or evident fear. Its notes during cold weather are short and low. Later, however, during the breeding season, the voice of the male becomes harsh and loud, not much unlike that of the common house wren of the Atlantic States.—S.

CISTOTHORUS PALUSTRIS, Cabanis.

Long-billed Marsh Wren.

Certhia palustris, WILSON, Am. Orn. II, 1810, 58; pl. xii, f. 4.

Troglodytes palustris, BONAP. Obs. Wilson, 1824, No. 66.—SWAINSON, F. Bor. Am. II, 1832, 319.—AUDUBON, Orn. Biog. I, 1831, 500; V, 1839, 467; pl. 100. Ib. Birds Amer. II, 1841, 135; pl. 123. NEWBERRY, Zool. Cal. & Or. Route; P. R. R. Rep. VI, iv, 1857, 80.

Thyrothorus palustris, NUTTALL, Man. I, 1832, 439.—BON. List, 1838.

Thyrothorus arundineus, VIEILLOT, Nouv. Dict. XXXIV, 1819, 58. (Not *Troglodytes arundinaceus*, Vieillot, Ois. Am. II, pl. cviii.)

Thyrothorus arundinaceus, BONAP. Consp. 1850, 220.

Telmatodytes arundinaceus, CABANIS, Mus. Hein. 1851, 78. (Type.)

Cistothorus (Telmatodytes) palustris, "CAB." BAIRD, Gen. Rep. Birds, p. 364.

SP. CH.—Bill about as long as head. Tail and wing nearly equal. Upper parts of a dull reddish brown, except on the crown, interscapular region, outer surface of tertials, and tail feathers, which are almost black: the first with a median patch like the ground color; the second with short streaks of white, extending round on the sides of the neck; the third indented with brown; the fourth barred with whitish, decreasing in amount from the outer feather, which is marked from the base to the fifth, where it is confined to the tips; the two middle feathers above like the back, and barred throughout with dusky. Beneath rather pure white, the sides and under tail coverts of a lighter shade of brown than the back; a white streak over the eye. Length, 5.50; extent, 9.75; wing, 2.08; tail, 2.00. Iris, brown; bill and feet, lighter brown.

Hab.—North America, from Atlantic to Pacific; north to Greenland. (Reinhardt.)

I found the marsh wren abundant in the salt marshes along the coast, and having observed them late in fall and early in March, I think they probably winter in the Territory.—C.

Abundant in the salt marshes at the mouths of the rivers emptying into Puget Sound. Like the rail, this bird allows a very near approach, until the intruder is very nearly upon it, when suddenly rising from the long grass, a quick rapid flight for eight or ten yards, a sudden plunge into the grass or sedge, and again the little creature is securely hidden. They have a very happy faculty of travelling rapidly through the grass, so that it is rare, even when haste is made, to flush the bird at the same point he was just before "marked down" at.

A specimen killed on the 18th of July, 1856, on the Nisqually marshes, Puget Sound, measured 4.75 inches in length; extent, 6.75. The upper mandible, dusky black; lower, dusky

horn color. Another killed at the same locality: length, $5\frac{1}{2}$; extent, 7; bill, .75. These measurements show a considerable difference in the size of different individuals. I found the young of the year capable of flight by the middle of July.—S.

TROGLODYTES PARKMANI, Aud.

Parkmann's Wren.

Troglodytes parkmanni, AUD. Orn. Biog. V, 1839, 310, not figured.—IB. Syn. 1839, 76.—IB. Birds Amer. II, 1841, 133; pl. 122.—BAIRD, Gen. Rep. Birds, p. 367.

SP. CH.—Similar in size and general appearance to *T. aedon*, with light line over the eye, &c.; the colors, however, grayer, the upper parts dark brown, the lower grayish white, with little or none of the rufous tinge of particular regions. Tail and wings about equal. Bill shorter than the head. Above brown, darker towards the head, brighter on the rump. The feathers everywhere, except on the head and neck, barred with dusky; obscurely so on the back, and still less on the rump. All the tail feathers barred from the base; the contrast more vivid on the exterior ones. Under tail coverts whitish, with dusky bars. An indistinct line over the eye, eyelids, and loreal region, whitish. Cheeks brown, streaked with whitish.

HAB.—Western America, from the high central plains and Upper Missouri, to the Pacific.

“Parkmann's wren” of Audubon is common about Puget Sound, where it seems to take the place of the house wren, though less familiar. Its habits and song are very similar, but it seems to frequent only the vicinity of woods and piles of logs, not seeking a dwelling about buildings. It arrives about April 20.

I noticed wrens at Vancouver in June, 1853, which I took for the house wren, though the song struck me as different. One built in a horse's skull stuck upon a fence. I am uncertain whether they were not the above species, which may entirely replace the house wren in the Territory.—C.

I obtained several specimens of this bird at Fort Steilacoom; the birds differed so in measurements, that, when collected, I was frequently in doubt whether they were identical in species.

Smithsonian Cat. No.	Original number.	Length.	Stretch of wings.
7135-----	127	4.25	6.50
7136-----	363	5.50	7.00
7137-----	380 ♂	5.25	9.00

The voice of this species is harsh and unmusical.—S.

TROGLODYTES HYEMALIS, Vieillot.

Winter Wren.

Sylvia troglodytes, WILSON, Am. Orn. I, 1808, 139; pl. viii, fig. 6.

Troglodytes hyemalis, VIEILLOT, Nouv. Dict. XXXIV, 1819, 514.—BONAP. List, 1838.—IB. Conspectus, 1850, 222.—

Sw. F. B. Am. III, 831, 318.—AUD. Orn. Biog. IV, 1838, 430; pl. 360.—IB. Syn. 1839, 76.—

IB. Birds, Am. II, 1841, 128; pl. 121.—BAIRD, Gen. Rep. Birds, p. 369.

Troglodytes europaeus, BON. Obs. Wils. 1825; No. 137.—NUTTALL, Man. 1, 1832, 427.

SP. CH.—Bill very straight, slender, and conical; shorter than the head. Tail considerably shorter than the wings, which reach to its middle. Upper parts reddish brown, becoming brighter to the rump and tail; everywhere, except on the head and upper part of the back, with transverse bars of dusky and of lighter. Scapulars and wing coverts with spots of white. Beneath pale reddish brown, barred on the posterior half of the body with dusky and whitish, and spotted with

white more anteriorly; outer web of primaries similarly spotted with pale brownish white. An indistinct pale line over the eye. Length, about 4.50 inches; extent, 5.25; wing, 1.66; tail, 1.26. Iris, brown; feet, brownish yellow.

Hab.—North America generally.

The winter wren is probably the most common species in the forests of the Territory, and frequents even the densest parts of them, where its lively song is almost the only sound to be heard. It is most commonly seen in winter as it retires in summer to the mountains to breed. I observed young birds on the Coast mountains in July, but have never seen its nest.—C.

The little winter wren is found at Fort Steilacoom more abundantly in winter than any other species. It is very unsuspicious, allowing a near approach. A specimen obtained near Fort Steilacoom, in January, 1854, was shot in a dense fir forest, where, among fallen logs, &c., it made its home. I have frequently seen birds of this species in similar situations during the long, dreary, damp, Oregon winter, and fancy that they are in the habit of retiring to these solitudes to await the coming of the bright days of spring, when they emerge, and, in company with the *T. Bewickii*, are frequently found among the more open thickets. *Individuals* are, however, found throughout winter in the more open situations.

The species *parkmanni* & *hyemalis* are certainly much alike in habits, affecting the same situation, and having much the same general characteristics.

A bird of this species, apparently in good condition, killed in December, 1853, at Fort Steilacoom, weighed exactly two drachms.—S.

Family C E R T H I A D A E.—The Creepers.

CERTHIA AMERICANA, Bonap.

American Creeper.

Certhia americana, BONAP. Consp. List, 1838.—REICH. Handb. I, 1851, 265; pl. dcxv, fig. 4102, 3.—BAIRD, Gen. Rep. Birds, p. 372.

Certhia familiaris, VIEILLLOT, Ois. Am. Sept. II. 1807, 70.—WILSON, Am. Orn. I, 1808, 122; pl. viii.—AUD. Orn. Biog. V, 1839, 158; pl. 415.—IB. Syn. 1839, 73.—IB. Birds Amer. II, 1841, 109; pl. 115.

? *Certhia mexicana*, "GLOGER, Handbuch," REICHENBACH, Handbuch Spec. Orn. I, 1851, 265; pl. dlxii, fig. 3841, 2.—IB. SCLATER, Pr. Zool. Soc. 1856, 290.

SP. CH.—Bill about the length of the head. Above dark brown, with a slightly rufous shade, each feather streaked centrally but not abruptly with whitish; rump rusty. Beneath almost silky white; the under tail coverts with a faint rusty tinge. A white streak over the eye; the ear coverts streaked with whitish. Tail feathers brown centrally, the edges paler yellowish brown. Wings with a transverse bar of pale reddish white across both webs.

Length, 5.50; wing, 2.60; tail, 2.90. (No. 827.)

Hab.—North America generally.

The brown creeper is abundant in the forests, but difficult to see from its similarity in color to the bark along which it creeps. It appears to reside constantly in the Territory.—C.

I have obtained several specimens of the American creeper in the oak groves in the vicinity of Fort Steilacoom. In habits the Oregon bird resembles that of the Atlantic States.—S.

SITTA CANADENSIS, Linn.

Red-bellied Nuthatch.

Sitta canadensis, LINN. Syst. Nat. I, 1766, 177.—NUTTALL, Man. I, 1832, 583.—AUD. Orn. Biog. II, 1834, 24; V, 474; pl. 108.—IB. Birds Amer. IV, 179; pl. 248.—BON. Consp. 1850, 227.—BAIRD, Gen. Rep. Birds, p. 376.

Sitta varia, WILS. Am. Orn. I, 1808, 40; pl. ii.

Sitta stulta, VIEILL. Nouv. Dict. (?)

SP. CH.—Above ashy blue. Top of head black; a white line above and a black one through the eye. Chin white; rest of under parts brownish rusty. Lower mandible pale brown color, its tip black; upper mandible black. Feet and legs dusky greenish yellow. Length about 4.80 inches; extent, 8.25 to 9.50; wing, 2.60.

Hab.—North America to the Rocky mountains. Probably also to the Pacific.

The Canada nuthatch is common in the Territory, preferring the oaks and other deciduous trees, and never frequenting the interior of the dense forests. I observed this and the next species at 49°, east of the Cascade mountains, as late as October 15.—C.

A nuthatch, apparently of this species, I found rather abundant west of the Cascade mountains in Washington Territory, but not quite so abundant as the other species. Habits similar to those of *S. canadensis* in the eastern States.—S.

SITTA ACULEATA, Cassin.

Slender-bill Nuthatch.

Sitta aculeata, CASSIN, Pr. A. N. Sc. Phila. VIII, Oct. 1856, 254.—BAIRD, Gen. Rep. Birds, p. 375

SP. CH.—Above ashy blue. Top of head and neck black. Under parts and sides of head to a short distance above the eye white. Under tail coverts and tibial feathers brown; concealed primaries white. Precisely similar to *S. carolinensis*, but the bill slenderer and more attenuated.

Length, 5.75 to 6 inches; extent, 9.80 to 10.50; wing, about 3½.

Hab.—Pacific coast, and east towards the Rocky mountains.

The slender-billed nuthatch is common in similar places with the preceding, and has the same habits.—C.

This bird is quite abundant at Puget Sound. It prefers searching for insects on deciduous trees rather than on the conifera.—S.

SITTA PYGMAEA, Vigors.

California Nuthatch.

Sitta pygmaea, VIGORS, Zool. Beechey's Voyage, 1839, 25; pl. iv.—AUDUBON, Orn. Biog. V, 1839, 68; pl. 415.—IB.

Syn. 1839, 168.—IB. Birds Amer. IV, 1842, 184; pl. 250.—NEWBERRY, Zool. Cal. Or. Route; P. R.

R. Rep. VI, IV, 1857, 79.—BAIRD, Gen. Rep. Birds, p. 378..

SP. CH.—Above ashy blue; head and upper part of neck greenish ashy brown, its lower border passing a little below the eye, where it is darker; nape with an obscure whitish spot. Chin and throat whitish; rest of the lower parts brownish white, the sides and behind like the back, but paler. Middle tail feather like the back; its basal half with a long white spot; its outer web edged with black at the base. Length about 4 inches; wing, 2.40.

Hab.—Pacific coast and towards Rocky mountains.

I met with the California nuthatch only in the open pine forests at Fort Colville, near the 49th degree, associated in small flocks, on the 20th October, when there were heavy frosts at night. They were actively hunting among the high branches, making a chirping noise like young chickens, and following each other from tree to tree. In habits they much resemble the *Parus minimus*.

This bird, like many other California species, probably migrates only along the east side of the mountains, shunning the damp spruce forests near the coast.—C.

Family PARIDAE.—The Titmice.

PARUS OCCIDENTALIS, Baird.

Western Titmouse.

Parus occidentalis, BAIRD, Gen. Rep. p. 391.

SP. CH.—Tarsi lengthened. Tail graduated; outer feather about .25 of an inch shorter than the middle.

Above dark brownish ash; head and neck above and below black, separated on the sides by white; beneath light dirty, rusty yellowish brown, scarcely whiter along the middle of body. Tail and wings not quite so much edged with whitish as in *P. atricapillus*.

Length, 4.75 to 5.12; extent, 7.60; wing, 2.40; tail, 2.40. Iris brown, bill black, feet gray.

Hab.—North Pacific coast of United States.

The common black-capped chickadee, so abundant in the eastern States, is in this Territory represented by the western titmouse, frequenting the low thickets and trees, where it is always busily employed seeking food. I observed its nests near Puget Sound, burrowed in soft rotten wood.—C.

Quite abundant in the valley of the Willamette, also at Fort Vancouver during winter. In habits it resembles closely the black-capped chickadee of the Atlantic States.—S.

PARUS MONTANUS, Gambel.

Mountain Tit.

Parus montanus, GAMBEL, Pr. A. N. Sc. 1, April, 1843, 259, (Santa Fé.)—CASSIN, Illust. 1, 1853, 18.—BAIRD, Gen.

Rep. Birds, p. 394.

SP. CH.—Head and neck above, with under part of head and throat glossy black; forehead, line above the eye and one below it, involving the auriculars, white. These stripes, embracing between them a black line through the eye and confluent with the black of the head. Above ashy; beneath similar, but paler; the upper part of breast and middle line of belly white.

Length about 5 inches; wing, 2.60; tail, 2.40.

Hab.—Pacific coast of United States, probably to the Rocky mountains; Fort Dalles, Oregon.

I obtained one of these birds at Fort Dalles, in February, 1854. It must be very rare in that vicinity, as I never succeeded in getting another.—S.

PARUS RUFESCENS, Towns.

Chestnut-backed Tit.

Parus rufescens, TOWNSEND, J. A. N. Sc. Phil. VII, II, 1837, 190.—AUDUBON, Orn. Biog. IV, 1838, 371; pl. 353.—IB.

Birds Am. II, 1841, 158; pl. 129.—CASSIN, Illust. 1853, 18.—BAIRD, Gen. Rep. Birds, p. 394.

Poecila rufescens, BON. Consp. 1850, 230.

SP. CH.—Whole head and neck above, and throat from bill to upper part of breast, sooty blackish brown. Sides of head and neck, upper part of breast, and middle of body, white; back and sides dark brownish chestnut. Length, 4.75 to 5 inches; extent, 6.50 to 7.75; wing, 2.36; tail, 2.16.

Hab.—Pacific coast of the United States.

The rufous chickadee is the most abundant species in the forests of this Territory. It appears to prefer the dense evergreens, where large parties of them may be found at all seasons, busily seeking food among the leaves and branches, ascending even to the highest summits.

They are generally in company with the ruby-crowned wren, and sometimes with the other species of titmice. In April they burrow out a hole in the side of a soft rotten trunk, a few feet from the ground. The eggs I have never seen. During the spring they are generally seen in pairs, but as soon as the broods can fly, about June, they appear in small families.

They, at all seasons, sing their faint, lisping notes, repeated thrice, like those of the Blackcap. I noticed a single pair of this species in California, in November, 1855. In the evergreen forests these birds are doubtless abundant.—C.

Abundant at Fort Steilacoom, Washington Territory, where it is a constant summer resident. They are an unwary unsuspicious bird, allowing near approach, especially while busily engaged in feeding. Their habits in feeding resemble those of the other species of this genus, clinging head down to limbs, and searching every crack or cranny in the bark for their insect food.—S.

PSALTRIPARUS MINIMUS, Bonap.

Least Tit.

Parus minimus, TOWNSEND, Jour. A. N. Sc. Phila. VII, II, 1837, 190.—AUD. Orn. Biog. IV, 1838, 382; pl. 353, fig. 5, 6.—IB. Birds Amer. II, 1841, 160; pl. 130.

Poecila minima, BONAP. Conspectus, 1850, 230.

Psaltia minima, CASSIN, Illust. I, 1853, 20.

Psaltriparus minimus, BONAP. Comptes Rendus, XXVIII, 1854; Notes Orn. Delattre, 45.—BAIRD, Gen. Rep. Birds, p. 397.

SP. CH.—Tail long, feathers graduated. Above rather dark olivaceous cinereous; top and sides of head smoky brown. Beneath, pale whitish brown, darker on the sides. Length, 4 to 4.38; extent, 5.75; wing, 1.90; tail, 2.25.

HAB.—Pacific coast of United States.

This diminutive titmouse is quite abundant during summer at Fort Steilacoom. I could detect scarcely any difference in their habits from those of other species of the genus. They arrive at Fort Steilacoom towards the middle of April. I have never seen one in Oregon or Washington Territory during winter, and presume that they migrate to the south every autumn. *P. rufescens* and *P. atricapillus*, on the contrary, can always be found throughout the winter in greater or less numbers.—S.

The least chickadee, obtained by Townsend on the Columbia river, I have never seen north of it. I saw it in great abundance in California.—C.

Family ALAUDIDAE.—The Larks.

EREMOPHILA CORNUTA, Boie.

Sky Lark; Shore Lark.

Eastern and Northern variety.

Alauda cornuta, WILSON, Am. Orn. I, 1808, 85, (in text.)—RICH. F. BOR. Am. II.—MAXIM. Reise Nord. Am. I, 1839, 367.

Eremophila cornuta, BOIE, Isis, 1828, 322.—BAIRD, Gen. Rep. Birds, p. 403.

Phileremos cornutus, BONAP. List, 1838.

Otocoris cornutus, of authors.

Alauda alpestris, FORSTER, Phil. Trans. LXII, 1772, 383.—WILSON, Am. Orn. I, 1808, 85; pl. v, f. 4.—BON. Obs. 1825, No. 130.—NUTTALL, Man. I, 1832, 455.—AUD. Orn. Biog. II, 1834, 570; V. 448; pl. 200.—IB. Syn. 1839, 97.—IB. Birds Amer. III, 1841, 44; pl. 151.—JARDINE, Br. Birds, II, 329, (Am. sp.)

Western and Southern variety.

Alauda chrysolaema, WAGLER, Isis, 1831, 350.—Bp. Pr. Zool. Soc. 1837, 111.

Alauda minor, GIRAUD, 16 sp. Texas Birds, 1841.

Alauda rufa, AUD. Birds Amer. VII, 1843, 353; pl. 497.

Otocoris occidentalis, M'CALL, Pr. A. N. S. Phil. V, June, 1851, 218, Santa Fé.—BAIRD, Stansbury's Report, 1852, 318

SP. CH.—Above pinkish brown, the feathers of the back streaked with dusky. A broad band across the crown, extending backwards along the lateral tufts; a crescentic patch from the bill below the eye and along the side of the head; a jugular crescent, and the tail feathers, black; the innermost of the latter like the back. A frontal band extending backwards over the eye, and under parts, with outer edge of wings and tail white. Chin and throat yellow.

Length of Pennsylvania specimens, 7.75; wing, 4.50; tail, 3.25; bill above, .52.

VAR. *chrysolaema*, smaller and lighter colored. Length 6.50 to 7.25; extent 11.50 to 12.25; iris brown, bill black, bluish below, feet black.

Hab.—Everywhere on the prairies and desert plains of North America. Atlantic States in winter.

The shore or "horned" lark is abundant on the prairies of the interior, but I have only seen one on the coast border. They seem to be permanent residents in ordinary seasons, and are more gregarious and common in winter. I once met with one on a gravelly plain near Olympia, scratching out a hollow under a tussock of grass, for its nest, as late as the 1st of July.—C.

A very abundant summer resident on the gravelly prairies near Fort Steilacoom. It is a tame, unsuspicious bird, allowing man's approach to within a few feet of it. It is essentially a ground bird, rarely alighting on bushes or shrubs.—S.

Family FRINGILLIDÆ.—The Finches.

Sub-Family COCCOTHAUSTINÆ. Wood Finches.

HESPERIPHONA VESPERTINA, Bonap.

Evening Grosbeak.

Fringilla vespertina, COOPER, Annals New York Lyceum, N. H. I, II, 1825, 220. (Sault St. Marie.)—AUD. Orn. Biog. IV, 1838, 515: V, 235; pl. 373, 424.

Fringilla (Coccothraustes) vespertina, BON. Syn. 1828, 113.—IB. Zool. Jour. IV, 1828, 2.—IB. Am. Orn. II; pl. xv.

Coccothraustes vespertina, Sw. F. Bor. Am. II, 1831, 269.—AUD. Syn. 134.—IB. Birds Amer. III, 1841, 217; pl. 207.

Hesperiphona vespertina, BON. Comptes Rendus, XXXI, Sept. 1850, 424.—IB. Conspectus, 1850, 505.—BAIRD, Gen. Rep. Birds, p. 409.

Coccothraustes bonapartii, LESSON, Illust. de Zool. 1834; pl. xxxiv.

SP. CH.—Bill yellowish green, dusky at the base. Anterior half of the body dark yellowish olive, shading into yellow to the rump above, and the under tail coverts below. Outer scapulars, a broad frontal band continued on each side over the eye, axillaries, and middle of under wing coverts, yellow. Feathers along the extreme base of the bill, the crown, tibiae, wings, upper tail coverts, and tail, black; inner greater wing coverts and tertiaries white. Length, 7.50; extent, 13; wing, 4.30; tail, 2.75. Iris brown, legs pale brown. Female a little smaller.

Hab.—Pacific coast to Rocky mountains; northern America east to Lake Superior.

The evening grosbeak is a common resident in the forests, but as it frequents the summits of the tallest trees, its habits are difficult to observe. In January, 1854, during a snow storm, a flock descended to some low bushes at Vancouver, and began to eat the seeds. I obtained four of them. Since then I have only seen this bird flying high, among the poplars chiefly, on the seeds of which they feed, uttering their loud, shrill call-note. I have heard, in early morning, a few loud, clear whisted notes, which I supposed to be made by this bird.—C.

CARPODACUS CALIFORNICUS, Baird.

Western Purple Finch.

BAIRD, Gen. Rep. Birds, p. 413.

Third quill longest; first shorter than the fourth. Purple of head and rump much darker than in *C. purpureus*; the head, with a broad supra-orbital lateral band, lighter purple. Body crimson, palest on the rump and breast, darkest across the

middle of back and wing coverts, where the feathers have dusky centres. The red extends below continuously to the lower part of the breast, and in spots to the tibiae. The belly and under tail coverts white, streaked faintly with brown, except in the very middle. Edges of wings and tail feathers brownish red; lesser coverts like the back. Two reddish bands across the wings, (over the ends of the middle and greater coverts.) Lores dull grayish.

Female olivaceous brown; brighter on the rump. Beneath white. All the feathers everywhere streaked with brown, except on the middle of the belly and under coverts a superciliary light stripe. Length, 6.25; extent, 9.50 to 10; wing, 3.20. Iris brown, bill horn color, feet blackish brown.

Hab.—Pacific coast of United States.

The western purple finch is abundant, especially along the banks of rivers in the interior. A few remain all the year in the Territory, but the majority of them probably migrate south. I observed the first arrival of a large flock at the Straits of De Fuca in April, when they fed on the still unripe seeds of a species of cress. I found everywhere a larger proportion of brown birds than purple. I found no nests, but saw newly fledged young in June, which were of the brownish color. The song of this species is very fine; loud and varied, resembling that of several other singing birds so much that it might be supposed they were imitated.—C.

Very common at Fort Steilacoom during the summer.—S.

CHRYSOMITRIS TRISTIS, Bon.

Yellow Bird; Thistle Bird.

Fringilla tristis, LINN. Syst. Nat. I, 1766, 320.—GM. I, 907.—WILS. Am. Orn. I, 1808, 20; pl. i, f. 2.—AUD. Orn. Biog. I, 1831, 172: V, 510; pl. 33.

Carduelis tristis, BON. Obs. Wils. 1825, No. 96.—AUD. Syn. 1839, 116.—IB. Birds Amer. II, 1841, 129; pl. 181.

Chrysomitris tristis, BON. List, 1838.—IB. Conspectus, 1850, 517.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. Surv. VII, IV, 1857, 87.—BAIRD, Gen. Rep. Birds, p. 421.

Carduelis americana, (EDWARDS,) SW. & RICH. F. B. A. II, 1831, 268.

SP. CH.—Bright gamboge yellow; crown, wings, and tail black. Lesser wing coverts, band across the end of greater ones, ends of secondaries and tertiaries, inner margins of tail feathers, upper and under tail coverts, and tibia, white. Length, 5 inches; extent, 8.75; wing, 3. Iris brown, bill black, legs pale flesh color.

Hab.—North America generally.

The common yellow bird of the eastern States is abundant on the Columbia and along the sea-coast near its mouth, but I have never seen them about Puget Sound.—C.

I have looked very carefully for this species about Steilacoom, Puget Sound, in the most appropriate situations, such as large thistle patches, &c., but in vain. It may exist there, but I doubt it.—S.

CHRYSOMITRIS PINUS, Bonap.

Pine Finch.

Fringilla pinus, WILSON, Am. Orn. II, 1810, 133; pl. xvii, f. 1.—AUD. Orn. Biog. II, 1834, 455: V, 509; pl. 180.

Fringilla (Carduelis) pinus, BON. Obs. Wils. 1825, No. 103.

Linaria pinus, AUD. Synopsis, 1839, 115.—IB. Birds Amer. III, 1841, 125; pl. 180.

Chrysomitris pinus, BONAP. Consp. 1855, 515.—BAIRD, Gen. Rep. Birds, p. 425.

SP. CH.—Tail deeply forked. Above brownish olive. Beneath whitish, every feather streaked distinctly with dusky. Concealed bases of tail feathers and quills, together with their inner edges, sulphur yellow. Outer edges of quills and tail feathers yellowish green. Two brownish white bands on the wing. Length, 5.50; extent, 8.50; wing, 3.00; tail, 2.20. Iris brown, bill and feet grayish brown.

Hab.—North America from Atlantic to Pacific.

The pine finch is an abundant and constant resident in the Territory, migrating only to the

coast in winter, when it feeds chiefly on the seeds of alder. In summer they are still somewhat gregarious, though occupied with their nests and young. The only difference I observed in summer plumage was a brighter hue of the yellow bars on the wings. It closely resembles the yellow bird in habits and notes, but differs in the choice of its food, preferring the seeds of trees to the low plants on which the other feeds.—C.

CURVIROSTRA AMERICANA, Wilson.

Red Crossbill.

Curvirostra americana, WILS. Am. Orn. IV, 1811, 44; pl. xxxi, f. 1, 2.—BAIRD, Gen. Rep. Birds, p. 426.

Loxia americana, BON. List, 1838.—IB. Conspectus, 1850, 527.—BON. & SCHLEGEL, Mon. Loxiens, 5, tab. vi.—NEW-BERRY, Zool. California and Oregon Route, P. R. R. Rep. VI, iv, 1857, 87.

Loxia curvirostra, FORSTER, Phil. Trans. LXII, 1772, No. 23.—AUD. Biog. II, 1834, 559: V, 511; pl. 197.—IB. Birds Amer. III, 1841, 186; pl. 200.

SP. CH.—Male dull red; darkest across the back; wings and tail dark blackish brown.

Female dull greenish olive above, each feather with a dusky centre; rump and crown bright greenish yellow. Beneath grayish; tinged, especially on the sides of the body, with greenish yellow. Young entirely brown, paler beneath.

Male about six inches; extent, 10.50; wing, 3.30; tail, 2.25. Iris, bill, and feet, dark brown.

Hab.—North America generally, coming southward in winter. Resident in the mountains of Pennsylvania.

The crossbill is abundant near the coast, where it feeds in winter on the seeds of the black spruce. In summer it appears to retire to the high mountains to breed, but returns about September. The color of the males so closely resembles that of the young spruce cones that it is hard to distinguish them on a tree. There is, as in the last species, always a larger number of brown birds. I have not observed this bird in the forests of the fir, east of the Coast range. It seems to prefer those cones that are easy to break open.—C.

This bird, in certain seasons, is quite abundant at Puget Sound. This was the case in the spring of 1854. Since that time I have obtained but one specimen. I noticed in 1854, about my door at Fort Steilacoom, a pair on the ground near a pool of rain water; they appeared very tame, and allowed me to approach within a few feet.—S.

ÆGIOTHUS LINARIA, Cabanis.

Lesser Red Poll.

Fringilla linaria, LINN. Syst. Nat. I, 1766, 322.—AUD. Orn. Biog. IV, 1838, 538; pl. 375.

Acanthis linaria, BP. Conspectus, 1850, 541.

Ægiothus linaria, CABANIS, Mus. Hein. 1851, 161.—BAIRD, Gen. Rep. Birds, p. 428.

Linaria minor, SW. F. Bor. Am. II, 1831, 267.—AUD. Syn. 1839, 114.—IB. Birds Amer. III, 1841, 122; pl. 179.

SP. CH.—Above light yellowish, each feather streaked with dark brown. Crown dark crimson. Upper part of breast and sides of the body tinged with a lighter tint of the same; the rump and under tail coverts also similar, but still less vivid, and with dusky streaks. Rest of under parts white, streaked on the sides with brown. Loral region and chin dusky; cheeks, (brightest over the eye,) and a narrow front, whitish. Wing feathers edged externally, and tail feathers all round with white. Two yellowish white bands across the wing coverts; secondaries and tertiaries edged broadly with the same. Bill yellowish, tinged with brown on the culmen and gonys; the basal bristles brown, reaching over half the bill. Length, 5.25; extent, 9; wing, 3.10; tail, 2.70. Iris brown, bill yellow, feet black.

Hab.—Throughout eastern North America, coming south in winter. Washington Territory.—COOPER.

The lesser linnet I never saw but once, when a small flock appeared on the coast in winter. I obtained one specimen, which was unluckily destroyed afterwards. It seemed to have much the same habits as the pine finch, and fed on alder and thistle seeds.—C.

Sub-Family SPIZELLINAE. The Field Sparrows.

PASSERCULUS SANDWICHENSIS, Baird.

Large Savannah Sparrow.

Emberiza sandwichensis, GM. I, 1788, 875.

Emberiza arctica, LATHAM, Ind. Orn. I, 1790, 414.

Fringilla arctica, VIGORS, Zool. of Blossom, 1839, 20, (perhaps one of the smaller species.)—"BRANDT. Icon. Ross. 2, 6."

Euspiza arctica, BP. Conspectus, 1854, 60.

Emberiza chrysops, PALLAS, Zoog. Rosso-As. II, 1811, 45; tab. xlviii; fig. 1, (Unalaschka.)

Passerculus sandwichensis, BAIRD, Gen. Rep. Birds, p. 444.

SP. CH.—Feathers of the upper parts generally with a central streak of blackish brown; the streaks of the back with a slight rufous suffusion laterally; the feathers edged with gray, which is lightest on the scapulars. Crown with a broad median stripe of yellowish gray. A superciliary streak from the bill to the back of the head, eyelids, and edge of the elbow, yellow. A yellowish white maxillary stripe curving behind the ear coverts, and margined above and below by brown. The lower margin is a series of thickly crowded spots on the side of the throat, which are also found on the sides of the neck, across the upper part of the breast, and on the sides of the body. A few spots on the throat and chin. Rest of under parts white. Outer tail feathers and primary edged with white. Almost exactly like *P. savanna*, but half an inch larger, with much larger bill. Length, 6.12 inches; extent, 9.38; wing, 3.00; tail, 2.55. Iris brown, upper mandible dusky; lower, pale.

HAB.—Northwestern coast from the Columbia river to Russian America.

This sparrow seems to be only a passenger through the Territory, migrating northward in the end of April in pairs, and not returning until the end of September, when in flocks they frequent the shores and prairies along the sea-coast. Their plumage seems to be the same at all seasons, and I have never heard them utter any note but a chirp.—C.

Rather abundant as a spring visitor at Fort Steilacoom.

No. 308. April 17, 1856. Fort Steilacoom. Yellow band over the eyes distinct. Middle line on top of head well marked. Iris dark brown. Upper mandible dusky, lower pale. Measured $6\frac{1}{8}$, $9\frac{3}{8}$.—S.

PASSERCULUS ALAUDINUS, Bonap.

Gray Savannah Sparrow.

Passerculus alaudinus, BP. Comptes Rendus, XXXVII, Dec. 1853, 918, California.—IB. Notes Ornithologiques Delattre, 1854, 18. (Reprint of preceding.)—BAIRD, Gen. Rep. Birds, p. 446.

SP. CH.—Similar to *P. savanna*, but smaller; the bill rather slenderer and elongated. Little of yellow in the superciliary stripe, (most distinct anteriorly;) the rest of the head without any tinge of the same. General color much paler and grayer than in *P. savanna*. Breast with only a few spots. Length, 5.25 to 5.50; extent, 8.50; wing, 2.75; tail, 2.30.

HAB.—Coast of California and Lower Rio Grande of Texas and Mexico.

This meadow sparrow, so closely resembling the preceding in general appearance, frequents the same low meadows and prairies along the coast. I have never seen it in the interior. They arrived at the Straits of De Fuca in March and remained until late in October. They are always among the grass, and rarely leave it except to sing their faint and lisping trill from a low weed or bush. When fresh the iris is brown, the bill and feet brownish flesh-color.—C.

NOTE.—A finch strongly resembling the *Passerculus alaudinus*, Bonap., was obtained by me at Fort Steilacoom, July 18, 1856. It measured in length 5.75 inches; extent, 8.75. Bill purplish dusky; legs and feet flesh-colored and rather stout. It did not agree with any descrip-

tion to which I had access, and as the bird was lost before reaching Washington city, its precise position is undetermined. I find, however, on examining the birds in the Smithsonian collection, that it more nearly resembled the above named species than any other. Its description, as written in my note-book, is as follows: "A faint buff-yellow median line, from the base of bill to occiput. Head, throat, neck, back, and fore part of breast, yellow buff; paler beneath, and with a faint tinge of ferruginous above; coarsely streaked on the top of head, finely on neck, throat, and breast, widely on the back, with central lines and spots of dusky. Two bars of yellowish white on the wings, formed by the tips of the coverts. First primary edged with whitish, secondaries edged with chestnut. Tail feathers pointed and dusky, their margins faintly ferruginous. Breast posteriorly, belly, and lower tail coverts, white, tinged with yellowish."—S.

POOCÆTES GRAMINEUS, Baird.

Grass Finch; Bay-winged Bunting.

Fringilla graminea, GM., Syst. Nat. I, 1788, 922.—AUD. Orn. Biog. I, 1831, 473: V. 502; pl. 90.

Emberiza graminea, WILSON, Am. Orn. IV, 1811, 51; pl. xxxi, f. 5.—AUD. Syn. 1839, 102.—IB. Birds Amer. III, 1841, 65; pl. 159.

Fringilla (Zonotrichia) graminea, SWAINSON, F. B. Am. II, 1831, 254.

Zonotrichia graminea, BON. List, 1838.—IB. Conspectus, 1850, 478.

Poocætes gramineus, BAIRD, Gen. Rep. Birds, p. 447.

SP. CH.—Tail feathers rather acute. Above light yellowish brown; the feathers everywhere streaked abruptly with dark brown, even on the sides of the neck, which are paler. Beneath, yellowish white; on the breast and sides of neck and body streaked with brown. A faint light superciliary and maxillary stripe; the latter margined above and below with dark brown; the upper stripe continued around the ear coverts, which are darker than the brown color elsewhere. Wings, with the shoulder, light chestnut brown, and with two dull whitish bands along the ends of the coverts; the outer edge of the secondaries also is white. Outer tail feather and edge and tip of the second white. Length, about 6.12 to 6.75; extent, 9.50; wing, 3.10. Iris, bill, and feet brown.

HAB.—United States from Atlantic to the Pacific; or else one species to the high central plains, and another from this to the Pacific.

The bay-winged sparrow is common in summer on the prairies of the interior, arriving in April at Puget Sound, together with other species.—C.

Rather abundant on the Nisqually plains, Puget Sound.—S.

CHONDESTES GRAMMACA, Bonap.

Lark Finch.

Fringilla grammaca, SAY, in Long's Exped. R. Mts. I, 1823, 139.—BON. Am. Orn. I, 1825, 47; pl. v, f. 3.—AUD. Orn. Biog. V, 1839, 17; pl. 390.

Chondestes grammaca, BON. List, 1838.—IB. Conspectus, 1850, 479.—BAIRD, Gen. Rep. Birds, p. 456.

Emberiza grammaca, AUD. Synopsis, 1839, 101.—IB. Birds Amer. III, 1841, 63; pl. 158.

Chondestes strigatus, SWAINSON, Philos. Mag. I, 1827, 435.

SP. CH.—Hood chestnut, tinged with black towards the forehead, and with a median stripe and superciliary stripe of dirty whitish. Rest of upper parts pale grayish brown, the interscapular region streaked with dark brown. Beneath white, a round spot on the upper part of the breast. A maxillary stripe and a short line from the bill to the eye, continued faintly behind it, black. A white crescent under the eye, bordered below by black and behind by chestnut. Tail feathers dark brown, tipped broadly with white. Length, 6 to 7.12 inches; extent, 9.75 to 11.25; wing, 2.75 to 3.75.

HAB.—From Wisconsin and the prairies of Illinois (also in Michigan?) to the Pacific coast; south to Texas and Mexico.

One specimen of the lark finch was obtained by me at Fort Dalles, O. T. Not seen by me west of the Cascade mountains. Townsend gives it as an inhabitant of Oregon. The bird above-mentioned is now in the Smithsonian collection, numbered 4393. The measurements of this (a female) were somewhat above the average. Length, 6.75; extent, 10.87; wing, 3.50. Bill pale bluish, tip dusky. Irides brown.—S.

ZONOTRICHIA GAMBELII, Gambel.

Western White-crowned Sparrow.

Fringilla gambelii, NUTT. Man. (I, 2d. ed.) 1840, 556.—GAMBEL, Pr. A. N. Sc. Phila. I, 1843, 262. (California.)

Zonotrichia gambelii, GAMBEL, J. A. N. Sc. 2d series, I, Dec. 1847, 50.—BAIRD, Gen. Rep. Birds, p. 460.

Zonotrichia leucophrys, NEWBERRY, Zool. Cal. & Or. Route: Rep. P. R. R. VII, iv, 1857, 87.

SP. CH.—Head above and a narrow line through and behind the eye to the occiput black; a longitudinal patch in the middle of the crown, and a short line from above the anterior corner of the eye, the two confluent on the occiput, white. Sides of the head, fore part of breast, and lower neck all round, pale ash, lightest beneath and shading insensibly into the whitish of the belly and chin; sides of belly and under tail coverts tinged with yellowish brown. Interscapular region streaked broadly with dark chestnut brownish. Edges of the tertiaries brownish chestnut. Two white bands on the wing. The lores are gray throughout, this color continuous with a white superciliary stripe along the side of the head.

Female similar, but smaller; immature male with the black of the head replaced by dark chestnut brown, the white tinged with brownish yellow. Length, 6.50 to 7.25; extent, 9.38 to 10.75. Iris brown; bill yellow, tipped with brown; feet pale yellowish brown.

The western white-crowned sparrow is very abundant in all the prairie districts, especially where there are low bushes, and, unlike most of the sparrows, frequents the coast prairies, where I have found its nest and eggs. They arrived at the Straits of De Fuca about the end of March in large numbers. In October they retire southward, and I found them with the preceding and other species very common in fall in California.—C.

This bird is very abundant both at Fort Dalles and at Puget Sound, and is a constant summer resident at both places. It is a very fat species at all seasons, so much so that skinning is difficult to perform neatly.

It makes its nest in low bushes and among the stalks of lupins and other shrub-like weeds, generally preferring dry situations on prairies in places where a short flight will enable it to take shelter in thickets. A specimen (No. 158) obtained by me at Fort Dalles, I find described in my note book as having "the bill reddish yellow, its tip dusky; legs dingy reddish yellow; the feet of the same color, only more dusky."—S.

ZONOTRICHIA CORONATA, Baird.

Golden-crowned Sparrow.

Emberiza coronata, PALLAS, Zoog. Rosso-Asiat. II, 1811, 44; plate.

Emberiza atricapilla, AUD. Orn. Biog. V, 1839, 47; pl. 394; (not of Gmelin.)

Fringilla atricapilla, AUD. Synopsis, 1839, 122.—IB. Birds Amer. III, 1841, 162; pl. 193.

Fringilla aurocapilla, NUTTALL, Man. I, (2d ed.) 1840, 555.

Zonotrichia aurocapilla, BON. Consp. 1850, 478.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. VI, iv, 1857, 88.

Emberiza atricapilla, GM. I, 1788, 875, in part only.—LATH. Ind. 415.

Black-crowned Bunting, PENNANT, Arc. Zool. II, 364.—LATH. II, i, 202, 49; tab. lv.

Zonotrichia coronata, BAIRD, Gen. Rep. Birds, p. 461.

SP. CH.—Head, from bill to upper part of nape, pure black, the middle longitudinal third occupied by yellow on the anterior half, and pale ash on the posterior. Sides and under parts of head and neck, with upper part of breast, ash color, passing insensibly into whitish on the middle of the body; sides and under tail coverts tinged with brownish. A yellowish spot above the eye, bounded anteriorly by a short black line from the eye to the black of the forehead; this yellow spot, how-

ever, reduced to a few feathers in spring dress. Interscapular region, with the feathers, streaked with dark brown, suffused with dark rufous externally. Two narrow white bands on the wings.

Length, about 7 to 7.50 inches; extent, 9.75 to 10.12; wing, 3.30.

Hab.—Pacific coast from Russian America to southern California; Black Hills of Rocky Mountains.?

The large and handsome golden-crowned sparrow seems to be only a straggler in the forest regions west of the Cascade mountains, and, like other California birds, probably migrates more abundantly to the open plains eastward of them. I saw them but once near Puget Sound on the 10th of May, when they were probably migrating. Though I looked for them carefully during two months after that, I could find no more.—C.

This species resembles much, in habit and size, the last. It is also generally very fat—*too fat*, frequently, for skinning nicely. Audubon, in his Synopsis, says that the species is *rare*. This is not the case either in the vicinity of Fort Dalles or Fort Steilacoom, in both of which places it is in summer quite abundant.

The measurements of two specimens obtained by me at Fort Steilacoom are much larger than those given in Audubon's Synopsis. Another specimen, (No. 90,) killed in May, 1854, at Fort Steilacoom, measured 10.50 in extent, and weighed exactly one ounce.—S.

JUNCO OREGONUS, Sclater.

Oregon Snow Bird.

Fringilla oregona, TOWNSEND, J. A. N. Sc. VII, 1837, 188.—*IB.* Narrative, 1839, 345.—AUDUBON, Orn. Biog. V, 1839, 68; pl. 398.

Struthus oregonus, BON. List, 1838.—*IB.* Consp. 1850, 475.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. IV, IV, 1857, 88.

Niphoea oregona, AUDUBON, Synopsis, 1839, 107.—*IB.* Birds Amer. III, 1841, 91; pl. 168.—CAB. Mus. Hein. 1851, 134.

Junco oregonus, SCLATER, Pr. Zool. Soc. 1857, 7.—BAIRD, Gen. Rep. Birds, 466.

Fringilla hudsonia, LICHT. Beit. Faun. Cal. in Abh. Akad. Wiss. Berlin, for 1838, 1839, 424. (Not *F. hudsonia*, Forster.)

SP. CH.—Head and neck all round sooty black; this color extending to the upper part of the breast, but not along the sides under the wings. Interscapular region of the back and exposed surface of the wings dark rufous brown. A lighter tint of the same on the sides of breast and belly. Rump brownish ash. Outer two tail feathers white; the third with only an obscure streak of white. Length, about 6 inches; extent, 9; wing, 3.00. Iris brown; bill pale pink in winter; legs light brown.

Hab.—Pacific coast of the United States to the eastern side of the Rocky mountains. Stragglers as far east as Fort Leavenworth in winter and Great Bend of Missouri.

The Oregon snow bird is a common species throughout the Territory, especially in winter, when it comes about houses and farms, with exactly the same habits as the common Atlantic species. In summer I have only seen it about Puget Sound, where it builds. I never could discover its nest, which is built in the forest, and on the ground, according to Nuttall. I noticed fledged young as early as May 24. At this season they are not gregarious, and frequent principally the edges of woods, having much the habits of the sparrows.—C.

Extremely abundant throughout Washington and Oregon Territories, where it takes the same position as the *J. hyemalis* does in the eastern States. An individual obtained by me at Fort Steilacoom weighed exactly three drachms.—S.

SPIZELLA MONTICOLA, Baird.

Tree Sparrow.

Fringilla monticola, GM. Syst. Nat. I, 1788, 912.

Zonotrichia monticola, GRAY, Genera.

Spizella monticola, BAIRD, Gen. Rep. Birds, p. 472.

Fringilla canadensis, LATH. Index, I, 1790, 434.—AUD. Orn. Biog. II, 1834, 511: V, 504; pl. 188.

Emberiza canadensis, SW. F. B. Am. II, 1831, 252.—AUD. Syn. 1839.—IB. Birds Amer. III, 1841, 83; pl. 166.

Spizella canadensis, BON. List. 1838.—IB. Conspectus, 1850, 480.

Fringilla arborea, WILS. Am. Orn. II, 1810, 12; pl. xii, f. 3.

"Mountain Finch, LATH. Syn. II, I, 265."

SP. CH.—Middle of back, with the feathers, dark brown centrally, then rufous, and edged with pale fulvous, (sometimes with whitish.) Hood and upper part of nape continuous chestnut; a line of the same from behind the eye. Sides of head and neck ashy. A broad light superciliary band. Beneath whitish, with a small circular blotch of brownish in the middle of the upper part of the breast. Edges of tail feathers, primary quills, and two bands across the tips of the secondaries, white. Tertiaries nearly black; edged externally with rufous, turning to white near the tips. Lower jaw yellow; upper black. Length, 6.25 inches; wing, 3.

Hab.—Eastern North America to the Missouri; also on Pole creek and Little Colorado river, New Mexico.

Mentioned by Townsend as an inhabitant of Oregon. I shot a bird in January, 1855, at Fort Dalles, which, upon comparing with the description of *E. canadensis*, in Audubon's Synopsis, appeared to belong to that species. The skin was unfortunately lost.—S.

I saw once, in winter, some sparrows which I supposed to be the tree sparrow, but obtained no specimens. This was on the coast, and it is likely that they visit the interior at that season in great numbers, as it is mentioned by Townsend in his list of Oregon birds.—C.

SPIZELLA SOCIALIS, Bonap.

Chipping Sparrow.

Fringilla socialis, WILSON, Am. Orn. II, 1810, 127; pl. xvi, f. 5.—AUD. Orn. Biog. II, 1834, 21: V, 517; pl. 104.

Spizella socialis, BON. List, 1838.—IB. Conspectus, 1850, 480.—BAIRD, Gen. Rep. Birds, p. 473.

Emberiza socialis, AUD. Syn. 1839.—IB. Birds Amer. III, 1841, 80; pl. 165.

Spinites socialis, CABANIS, Mus Hein. 1851, 133. (Type.)

SP. CH.—Rump, back of neck, and sides of neck and head, ashy. Interscapular region with black streaks, margined with pale rufous. Crown continuous and uniform chestnut. Forehead black, separated in the middle by white. A white streak over the eye, and a black one from the base of the bill through and behind the eye. Under parts unspotted whitish, tinged with ashy, especially across the upper breast. Tail feathers and primaries edged with paler, not white. Two narrow white bands across the wing coverts. Length, 5.50; extent, 8.50; wing, nearly 3.00. Iris, brown; feet, pale brown; bill, black.

Hab.—North America, from Atlantic to Pacific.

The chipping sparrow frequents similar situations as in the east, and about houses shows the same familiar confidence as in the Atlantic States.—C.

This bird is common throughout the two Territories. I have obtained and preserved many skins. No appreciable difference in the habits of western individuals from those of the Atlantic coast. Extremely abundant in the open districts on the Columbia river, as well as upon the gravelly prairies of the Puget Sound district.—S.

MELOSPIZA RUFINA, Baird.

Western Song Sparrow.

"*Emberiza rufina*, BRANDT, Desc. Av. Rossic. 1836, tab. ii, 5, Sitka." BONAPARTE.

Passerella rufina, BONAP. Conspectus, 1850, 477.

Fringilla cinerea, (GM.) AUD. Orn. Biog. V, 1839, 22; pl. 390.—IB. Syn. 1839, 119.—IB. Birds America, III, 1841, 145; pl. 187.

?? *Fringilla cinerea*, GMELIN, I, 1788, 922.

Fringilla (*Passerella*) *guttata*, NUTTALL, Man. I, 2d ed. 1840, 581.

Zonotrichia guttata, GAMBEL, J. A. N. Sc. I, Dec. 1847, 50.

Melospiza rufina, BAIRD, Gen. Rep. Birds, p. 480.

SP. CH.—Bill slender. Similar in general appearance to *M. melodia*, but darker and much more rufous, the colors more blended. General appearance above light rufous brown, the interscapular region streaked very obsoletely with dark brownish rufous, the feathers of the crown similar, with still darker obsolete central streaks. A superciliary and very obscure median crown stripe, ashy. Under parts brownish whitish; the breast and sides of throat and body broadly streaked with dark brownish rufous; darker in the centre. A light maxillary stripe. Sides of the body tinged strongly with the colors of the rump, and leaving only a narrow space of the belly white. Under coverts brown. Length, 6.75; extent, 8.75; wing, 2.70; tail, 3.00. Bill, dusky; iris and feet, brown.

The western song sparrow is another instance of the closely analogous species found on this side of the continent, which, though constantly distinct in essential characters, are evidently made to fill the same place here as their relatives do on the Atlantic side. This species is a constant resident in the wild western portions of the Territory, never ranging far from the thicket which contains its nest, or the house where it has found food and protection. Almost every winter morning, as well as during summer, its cheerful song is heard from the garden or fence, as if to repay those who have shown it kindness or have even unconsciously protected it by their presence from rapacious animals. When unmolested it becomes very familiar, and the old birds will bring their young to the door to feed as soon as they leave the nest. Its song so nearly resembles that of the eastern bird in melody and variety that I cannot tell which is superior or point out the differences. In wild districts it is always to be found near brook-sides and thickets, where it seems to consider itself the proprietor, and jealously drives off other birds, either of the same or other species. Its nest is built on the ground or in a low bush. I have seen fledged young as early as May 6, at Olympia, although the rainy season was then scarcely finished.—C.

This is quite a common bird in the vicinity of Puget Sound, where it is resident throughout the year. I have found them in very different situations; in thickets at the edges of prairies, among stranded drift logs on open salt marshes, as well as in swamps and in the dense forests of Douglas fir, peculiar to the northwest coast. The voice of this species during the breeding season is singularly sweet and melodious, surpassing, I think, that of the meadow lark in melody and tone, but unequal to it in force.—S.

Sub-Family PASSERELLINAE.—Fox Sparrows.

PASSERELLA TOWNSENDII, Nuttall.

Townsend's Fox Sparrow.

Fringilla townsendii, AUD. Orn. Biog. V, 1839, 236; pl. 424, f. 7.—IB. Syn. 1839.—IB. Birds Amer. III, 1841, 43; pl. 187.

Fringilla (*Passerella*) *townsendii*, NUTT. Man. I, 2d ed. 1840, 533.

Passerella townsendii, BON. Conspectus, 1850, 477.—BAIRD, Gen. Rep. Birds, p. 489.

Fringilla meruloides, VIG. Zool. Blossom, (Monterey,) 1839, 19.

Emberiza unalaschensis, GM. I, 875, probably has some relation to the present species. It is based on the *Unalascha Bunting* of Pennant Arctic Zool. II, 364.

SP. CH.—Above very dark olive brown, with a tinge of rufous, the color continuous and uniform throughout, without any trace of blotches or spots; the upper tail coverts and outer edges of the wing and tail feathers rather lighter and brighter. The under parts white, but thickly covered with approximating triangular blotches like the back, sparsest on the middle of the body and on the throat; the spots on the belly smaller. Side almost continuously like the back; tibiae and under tail coverts similar, the latter edged with paler. Claws all very large and long; the hinder longer than its toe. First and sixth quills about equal.

Length, $7\frac{1}{2}$ inches; extent, 9 to 11 inches. Iris brown; bill black, with lower mandible yellow; feet brown.

Townsend's sparrow seems to be the western analogue of the fox-colored species which visit the northern States in winter. It is only a winter resident in this Territory, where, in company with the song sparrow and other species, it frequents the thickets, keeping principally on the ground, and scratching among the leaves. It is most common in the interior; but in very cold weather seeks the coast, together with the snow birds and "chewinks." I observed a few lingering about the Straits of De Fuca until April; after which I saw no more of them until their return southward in October. I never heard them sing during their winter residence.—C.

Rather abundant near Fort Steilacoom, although not as common as the song sparrow, which it much resembles in habits and general appearance.—S.

Sub-Family SPIZINAE.—Painted Sparrows.

CYANOSPIZA AMOENA, Baird.

Lazuli Finch.

Emberiza amoena, SAY, Long's Exped. II, 1823, 47.

Fringilla (Spiza) amoena, BONAP. Am. Orn. I, 1825, 61; pl. vi, f. 5.

Fringilla amoena, AUD. Orn. Biog. V, 1839, 64, 230; pls. 398 and 424.

Spiza amoena, BONAP. List, 1838.—AUD. Syn. 1839, 109.—IB. Birds Am. III, 1841, 100; pl. 171.

SP. CH.—Male.—Upper parts generally, with the head and neck all round, greenish blue; the interscapular region darker. Upper part of breast pale brownish chestnut, separated from the blue of the throat by a faint white crescent; rest of under parts white. A white patch on the middle wing coverts, and an obscurely indicated white band across the ends of the greater coverts. Loral region black. Length, about 5.50; wing, 3.90; tail, 2.60.

Female.—Brown above; whitish beneath, with a trace of a buff pectoral band.

Hab.—High central plains to the Pacific.

Male.—Length, 5.5; extent, 8.5. Iris brown; bill black; feet dark brown.

The brilliant little Lazuli finch arrives at Puget Sound about May 15, and is abundant in open districts of the interior during the summer. Its habits and notes closely resemble those of the indigo bird, but its song is fainter. It builds a very similar nest, in a low bush, of fibrous roots and strips of bark, with which it is securely fastened to the surrounding branches. In this it lays four or five white eggs, faintly tinged with bluish. The plain flax brown female is rarely seen; but the male is not shy, but, if watched, will retire into the thickets.—C.

Found at the Dalles, Oregon Territory. Not seen by me west of the Cascades. The specimen I obtained at the Dalles was shot out of a flock of several hundred individuals which

had just arrived from the south in the spring. The fact of the *return* north of this species in large flocks is worthy of notice.—S.

GUIRACA MELANOCEPHALA, Sw.

Black-headed Grosbeak.

Guiraca melanocephala, Sw. Syn. Mex. Birds, Philos. Mag. I, 1827, 438.—Bon. List, 1838.—Ib. Consp. 1850, 502.—

BAIRD, Gen. Rep. Birds, p. 498.

Coccothraustes melanocephala, RICH. List, Pr. Brit. Ass. for 1836, 1837.

Fringilla melanocephala, AUD. Orn. Biog. IV, 1838, 519; pl. 373.

Coccyborus melanocephalus, AUD. Synopsis, 1839, 133.—Ib. Birds Amer. III, 1841, 214; pl. 206.

SP. CH.—Head above and on the sides, with chin, back, wings, and tail, black. A broad median stripe on the crown, a stripe behind the eye, a well marked collar on the hind neck all round, edges of interscapular feathers, rump, and under parts generally pale brownish orange, almost light cinnamon. Middle of belly, axillaries, and under wing coverts, yellow. Belly just anterior to the anus, under tail coverts, a large blotch at the end of the inner webs of first and second tail feathers, a band across the middle and greater wing coverts, some spots on the ends of the tertiaries, the basal portions of all the quills, and the outer three primaries near the tips, white.

This bird is sparingly found in the vicinity of Fort Steilacoom, at which place I obtained two specimens. The person who killed these informed me that the song of the species is much like the *continued* lay of the robin, (*T. migratorius*,) but stronger and clearer.

No. 393, male, in immature plumage, killed at Fort Steilacoom, May 19, 1856. Length, 8; extent, 11.87. Another, No. 450, killed in June, same plumage, but *female*. Both these specimens were unfortunately lost among a batch of 110 birds sent by me from Fort Steilacoom, Puget Sound, in 1856, which have never since been heard of.—S.

PIPILO OREGONUS, Bell.

Oregon Ground Robin.

Pipilo oregonus, BELL, Ann. N. Y. Lyc. V, 1852, 6. Oregon.—BONAP. Comptes Rendus, XXXVII, Dec. 1853

922.—Ib. Notes Orn. Delattre, 1854, 22, (same as prec.)

Fringilla arctica, AUD. Orn. Biog. V, 1839, 49; pl. 394.

Pipilo arctica, AUD. Syn. 1839, 123.—Ib. Birds Am. III, 1841, 164; pl. 194, (not of Swainson.)

SP. CH.—Upper surface generally, with the head and neck all round to the upper part of the breast, deep black; the rest of lower parts pure white, except the sides of the body and under tail coverts, which are light chestnut brown; the latter rather paler. The outer webs of scapulars (usually edged narrowly with black) and of the superincumbent feathers of the back, with a rounded white spot at the end of the outer webs of the greater and middle coverts; the outer edges of the innermost tertials white; no white at the base of the primaries. Outer web of the first tail feather black, occasionally white on the extreme edge; the outer three with a white tip to the inner web. Length 8.50; extent 10.50; wing 4.40; tail 4. Female with the black replaced by brownish. Iris red; bill black and brown; feet brown. Iris of female olive brown.

Hab.—Coast of Oregon and Washington Territory.

The Oregon chewink is another representative species, having so closely the manner and appearance of the Atlantic species that a common observer might consider it no more than a local variety. But it differs much in song, having none of the plaintive call from which the other takes its name, its cry when disturbed being a kind of "mew," from which it has derived the name of "cat-bird" in the country. Its song in spring, as it sits on a low bush enjoying the sunshine, is like the final trill of the red-wing, or the lisping, faint notes of the cow-bird. It is a constant resident in the Territory, but does not frequent the edge of the coast, except in winter. I also found it abundant about thirty miles south of San Francisco in autumn, and it is probably common to the whole region west of the Rocky mountains.—C.

Several Towhe buntings have been obtained by me west of the Cascade mountains. In habits they almost precisely resemble the species found in the Atlantic States, affecting principally brushy openings and swamp thickets. A specimen, marked 156, got by me at Fort Dalles, has on its label "Iris orange."—S.

Family ICTERIDAE.—The Trupials.

AGELAIUS PHOENICEUS, Vieillot.

Swamp Blackbird; Red-wing Blackbird.

Oriolus phoeniceus, LINN. Syst. Nat. I, 1766, 161.—GMELIN, I, 1788, 386.—LATH. Ind. Orn. I, 1790, 428.

Agelaius phoeniceus, "VIEILLOT, Anal. 1816."—SWAINSON, F. Bor. Am. II, 1831, 280.—BONAP. List, 1838.—IB. Consp. 1850, 430.—AUD. Syn. 1839, 141.—IB. Birds Amer. IV, 1842, 31; pl. 216.—BAIRD, Gen. Rep. Birds, p. 526.

Icterus phoeniceus, LICHT. Verz. 1823, No. 188.—BON. Obs. Wils. 1824, No. 68.—AUD. Orn. Biog. I, 1831, 348; V, 1839, 487; pl. 67.

Psarocolius phoeniceus, WAGLER, Syst. Nat. 1827, No. 10.

Icterus (Xanthornus) phoeniceus, BONAP. Syn. 1828, 52.—NUTTALL, Man. I, 1832, 167; 2d ed. 179.

Sturnus prædatorius, WILSON, Am. Orn. IV, 1811, 30; pl. xxx.

Red-winged oriole, PENNANT, Arctic Zool. II, 255.

SP. CH.—Tail much rounded; the lateral feathers about half an inch shorter. Fourth quill longest; first about as long as the fifth. Bill large, stout; half as high, or more than half as high as long.

Male.—General color uniform lustrous velvet black, with a greenish reflection. Shoulders and lesser wing coverts of a bright crimson or vermilion red. Middle coverts brownish yellow, and usually paler towards the tips.

Female.—Brown above, the feathers edged or streaked with rufous brown and yellowish; beneath white, streaked with brown. Fore part of throat, superciliary, and median stripe strongly tinged with brownish yellow. Length of male, 9 to 9.50; extent, 14; wing, 5; tail, 4.15. Female smaller. A winter specimen measured only 8.25—12.75; probably of a late brood.

Hab.—United States, from Atlantic to Pacific.

The red-wing blackbird is not so abundant in this Territory as in more open countries, and is commonly to be found only about cultivated tracts. In the route of the expedition, after leaving Fort Vancouver, we saw none until reaching the farms at Fort Colville, near the 49th parallel, none apparently inhabiting the bare and mountainous prairie regions east of the Cascade mountains. During winter at Vancouver I found *this species only*, remaining in small flocks about stables and haystacks. They rarely visit the extensive salt meadows near the mouth of the Columbia, but are more common about Puget Sound—mostly near settlements, as usual. Compared with the immense numbers, of five different species, seen in California, blackbirds are only stragglers in this Territory.—C.

The swamp blackbird is quite common west of the Cascade mountains, preferring, as in other situations, the reedy borders of small lakes for its habitat. It arrives from the south in March.

A specimen of *A. gubernator* is mentioned by Baird in the General Report as having been collected by Dr. Townsend on the Columbia river. I suspect that it is very rarely found so far north, having never obtained it in Washington Territory myself, and I have never heard of any being found there but the specimen above mentioned. It is there replaced by the red-wing.—S.

STURNELLA NEGLECTA, Aud.

Western Meadow Lark.

Sturnella neglecta, AUD. Birds of Amer. VII, 1843, 339.

BAIRD, Gen. Rep. Birds, 537, and others.

SP. CH.—The feathers above dark brown, margined with brownish white, and with a terminal blotch of pale reddish brown. Exposed portions of wings and tail with transverse dark brown bars, which on the middle tail feathers are not confluent along the shaft. Beneath yellow, with a black pectoral crescent, the yellow extending on the side of the maxilla; sides, crissum, and tibiae, pale reddish brown, streaked with blackish. A light median and superciliary stripe, the latter yellow anterior to the eye; a black line behind.

Length, 10 to 10.50; extent, 15 to 17; wing, 5.25; tail, 3.25; bill, 1.25. Irids brown. Several specimens from Puget Sound scarcely differ from *S. magna*.

This species is so very closely related to *S. magna* as to render it very difficult to distinguish them. The same description as to pattern, colors, size, &c., will apply almost equally well to both. The prevailing shade of color is, however, decidedly paler in *neglecta*.

Habitat.—Western America, from high central plains to the Pacific. Very abundant on the Columbia and at Puget Sound.

I found the western meadow lark very abundant in all the prairies of the Territory, where it resides constantly, merely visiting the warmer coast meadows in very cold weather, but not remaining there during summer. The only reason I can assign why this and many other birds shun the seacoast is the prevalence of strong sea breezes there in summer, and a little greater amount of rain. It is, however, abundant on the higher and more sheltered prairies of Whidby island, at the Straits of De Fuca. I observed the habits and song of the meadow larks closely and in every locality, but could never see anything to characterize more than one species. Their song differs in notes, but not in style or tone, in different parts of the continent. A nest and eggs found at Steilacoom agree exactly with those of the Atlantic States. Is it not probable that the smaller specimens supposed to be of another species are only stunted birds of late broods, as is the case with the red-wings? I have found specimens of *all sizes*, from 10 to 11 $\frac{3}{4}$ inches in length, and 16 to 16 $\frac{3}{4}$ inches extent. The smallest I got in winter, at Vancouver, when but few remained, and those probably of late broods. In my late journey to Fort Laramie, Nebraska Territory, I observed with much surprise the fact first mentioned by Audubon, that after getting fairly out on the plains the song of the larks differs very much from that of the eastern bird, being louder and more varied; the same tunes prevailing as in Washington Territory and California, and thus corresponding with the range of the western species.—C.

This bird I found common on the east side of the Rocky mountains. It is exceedingly abundant throughout Oregon and Washington Territories, where a few remain throughout every winter. Their notes, calls, and songs, as already stated, are identical with those of the foregoing species, although I think that *one* call, or note of alarm, common to the *S. magna*, is wanting. This is the cry of the latter bird, probably familiar to many, but very difficult to describe, produced by the male when alarmed during the breeding season, flying from low bush to low bush, or to other points but slightly elevated from the ground, he endeavors to decoy the invader to a distance from his nest or young. It is a quick cry of either two or four syllables, dwelling long upon and accenting the last.

The greater number of individuals of this species retire to the south during the winter, but return very early in the spring, generally in early March. Pasture lands, open meadows, and prairies, are their favorite resort. In the fall they congregate in flocks before migrating.

In 1855 a few were seen as early as March 5 at Fort Dalles. On the 7th of the same month

I found them quite abundant on the ploughed fields near Fort Vancouver. Some of these had probably remained throughout the winter. I found them quite abundant at Fort Steilacoom in February, 1856. At Fort Dalles, on the 2d of May, 1855, I obtained young birds nearly fledged.—S.

ICTERUS BULLOCKII, Bon.

Bullock's Oriole.

Xanthornus bullockii, Sw. Syn. Mex. Birds, Taylor's Phil. Mag. I, 1827, 436.

Agelaius bullockii, Rich. Rep. Brit. Assoc. 1837.

Icterus bullockii, Bon. List, 1838.—Aud. Orn. Biog. V. 1839, 9; pl. 388 and 433.—Ib. Birds Amer. IV, 1842, 43; pl. 218.—NEWBERRY, Rep. P. R. R. VI, IV, 1857, 87.—BAIRD, Gen. Rep. Birds, p. 549.

SP. CH.—Tail very slightly graduated. Upper part of the head and neck, back, wings, two central tail feathers, line from base of bill through the eye to the back of the nape, and a line from the base of the bill running to a point on the throat, black. Under parts generally, sides of head and neck, forehead and line over the eye, rest of tail feathers, rump, and upper tail coverts, yellow orange. A broad band on the wings, involving the greater and middle coverts, and the outer edges of the quills, white. Young male with the black replaced by greenish yellow, that on the throat persistent; female without this.

Length, about 7.50 inches; wing, 3.80; extent 12; iris brown, bill, black above, bluish below, feet gray.

Hab.—High Central Plains to the Pacific; rare on upper Missouri; south into Mexico; more abundant in the sparsely wooded districts of the eastern base of the Cascade mountains than in the coast region of Washington Territory.

Bullock's oriole does not arrive at Puget Sound until the beginning of June, and is not very common there. Its habits are similar to those of the orchard oriole, it being shy and difficult to discover among the foliage. Its song is more like that of the Baltimore, loud, clear, and varied. Nuttall appears to have mistaken this song for that of the black-headed grosbeak, which I never met with in the Territory, and calls this oriole a poor musician. From its shyness and similar colors such a mistake might easily occur.

A nest, probably of this species, I found in California in November, containing eggs, which had been deserted. It was entirely formed of white horsehair and cotton twine, and suspended in a low branch of an oak.—C.

This beautiful bird is exceedingly abundant at Fort Dalles, and also along the east base of Mount Adams, in Washington Territory. In the spring it arrives at Fort Dalles at the same time as the *Muscicapa verticalis*. During May they are very abundant among the low oaks of that place. The song of the male is very pleasant, and is especially melodious early in the morning, when the bird is generally perched on the sunny side or top of an oak. I saw one or two individuals of this species on the Nisqually plains, Puget Sound, in the summer of 1854; whereas, in 1856, although I kept a bright lookout for it, I did not see one. This shows that this bird, like many others, is subject to caprices of migration. I obtained several skins at Fort Dalles, where, during the breeding season, it is easily obtained.

A specimen (No. 168) of a male of this species, obtained by me at Fort Dalles May 7, 1855, exceeded the average measurements given under the head of "specific characters:" length, 8.08; extent, 12.75; wing, 4.—S.

SCOLECOPHAGUS CYANOCEPHALUS.

Brewer's Blackbird.

Psarocolius cyanocephalus, WAGLER, Isis, 1829, 758.

Scolecophagus cyanocephalus, CABANIS, Mus. Hein. 1851, 193.

Scolecophagus mexicanus, SWAINSON, Anim. in Men. 24 cent. 1838, 302.—Bon. Conspectus, 1850, 423.—NEWBERRY, Zool. Cal. and Or. Route; Rep. P. R. R. Surv. VI, IV, 1857, 86.

Quiscalus breweri, AUD. Birds Amer. VII, 1843, 345; pl. 492.

Sp. Ch.—Bill stout, quiscaline, the commissure scarcely sinuated; shorter than the head and the hind toe; the height nearly half the length above. Wing nearly an inch longer than tail; the second quill longest; the first about equal to the third. Tail rounded and moderately graduated; the lateral feathers about .35 of an inch shorter. General color of male black, with lustrous green reflections everywhere except on the head and neck, which are glossed with purplish violet. *Female* much duller, of a light brownish anteriorly; a very faint superciliary stripe.

Male, $9\frac{3}{4}$ inches; extent, $16\frac{1}{4}$ inches. Female, $9\frac{1}{2}$ inches; extent, $14\frac{3}{4}$ inches; wing, 5.30; tail, 4.40.

Hab.—High Central Plains to the Pacific; south to Mexico; Pembina, Minn.

In winter I obtained specimens of the western grackle at Vancouver, and have no doubt that it is a constant resident at the Columbia river. I have never seen them at Puget Sound. In notes and habits they are scarcely distinguishable from the rusty grackle of the Atlantic States. In winter they kept about the stables in flocks of fifty or more, and on warm days would fly about more in the tree tops, where, with the redwing, they sang their harsh but pleasant chorus for some hours. They are found throughout the Territory and east of the Rocky mountains.—C.

Quite abundant at Fort Dalles; rare west of the Cascade mountains. The species is a winter resident at the Dalles, where in flocks it may frequently be found in cold weather in the vicinity of barnyards and stables. The iris of the male bird is of a *bright yellow*, that of the female *brown*.—S.

Family CORVIDAE.

Sub-Family CORVINAE. Crows.

CORVUS CARNIVORUS, Bartram.

American Raven.

Corvus carnivorus, BARTRAM, Travels in E. Florida, 1793, 290. BAIRD, Gen. Rep. Birds, p. 560.

Corvus corax, WILSON, Am. Orn IX, 1825, 136; pl. lxxv, f. 3.—BONAP. Obs. Wils. 1825, No. 36.—IB. Syn. 1828, 56.—DOUGHTY, Cab. N. H. I, 1830, 270; pl. xxiv.—RICH. F. B. Am. II, 1831, 290.—NUTTALL, Man. I, 1832, 202.—AUD. Orn. Biog. II, 1834, 476; pl. 101.—IB. Syn. 1839, 150.—IB. Birds Amer. IV, 1842, 78; pl. 224.

Corvus calott, NEWBERRY, P. R. R. Rep. VI, iv, 1857, 82.

Corvus lugubris, AGASSIZ, Pr. Bost. Soc. N. H. II, Dec. 1846, 188.

Sp. Ch.—Fourth quill longest; third and fifth quill about equal; second between fifth and sixth; first nearly equal to the eighth. Length, about 24 to 25 inches; extent, 50 to 51; wing, about 17, tail, 10. Tail moderately graduated, the outer about 1.60 to 1.90 of an inch less than the middle. Entirely glossy back, with violet reflections.

Hab.—Entire continent of North America. Rare east of the Mississippi.

The raven is very common in the mountainous western regions. During summer they are less abundant, as they are then scattered through the forests and mountains, but in winter they congregate about settlements and the sea-shore, where they can obtain a better supply of food. On the barren arid plains east of the Cascade mountains, they were very common during our journey there, while the common crow was rarely seen. At Vancouver, however, in winter, I observed them amicably associating together, and along the coast with the more gregarious fish-crows. Though they did not quarrel, the smaller crows would respectfully retire on the approach of the raven to its food. But during spring, when they had nests, the fish-crows would boldly attack and drive them away, being quicker and lighter on the wing than the raven. The only raven's nest I have seen was on a tree growing on a cliff about 50 feet high, on the shores of the Straits of De Fuca. It contained young in April.—C.

This bird I first found plentiful when, in going west, we reached the "great bend" of the upper Missouri. In the Rocky mountains and adjacent country it is very abundant, and

continues common to the Pacific coast. At Fort Steilacoom, in the summer of 1856, I obtained several specimens. One, obtained in 1854, at the same place, had a singular (abnormal) horny growth from the base of the lower mandible.—S.

CORVUS AMERICANUS, A u d.

Common Crow.

Corvus corone, WILSON, Am. Orn. IV, 1811, 79; pl. xxv, f. 3.—BON. Obs. Wils. 1824, No. 37.—IB. Syn. 1828, 56.—RICH. F. B. Am. II, 1831, 291.—NUTTALL, Man. I, 1832, 209. Not *Corvus carone* of Linn.

Corvus americanus, AUD. Orn. Biog. II, 1834, 317: V, 477; pl. 156.—IB. Syn. 1839, 150.—IB. Birds Amer. IV, 1842, 87; pl. 225.—BON. List, 1838.—IB. Consp. 1850, 385.—NUTTALL, Man. I, 2d ed. 1840, 221.—MAXIM. Reise, I, 1839, 140—NEWBERRY, Zool. Cal. & Or. Route, P. R. R. Rep. VI, iv, 1857, 82. BAIRD, Gen. Rep. Birds, p. 566.

SP. CH.—Fourth quill longest; second shorter than sixth; first shorter than ninth. Glossy black with violet reflections, even on the belly. Length, 19 to 20 inches; wing, 13 to 13.50; tail about 8. Tarsus longer than the middle toe and claw.

Hab.—North America to the Missouri region; also on the coast of California. (Not found on the High Central Plains?)

The common crow is somewhat less abundant than in the cultivated districts of the eastern States, and is generally to be found near settlements. I observed it in the open, uninhabited regions east of the Cascade mountains. Near the coast it appears rarely, the fish-crow replacing it.—C.

This species is occasionally met with in Washington Territory, but it is not abundant, being replaced by the succeeding species.—S.

CORVUS CAURINUS, Baird.

Northwestern Fish-Crow.

Corvus caurinus, BAIRD, Gen. Rep. 1858, p. 569.

SP. CH.—Fourth quill longest; fifth and third about equal; second longer than sixth; first shorter than ninth. Color black, glossed with purple. Tail nearly even. Tarsus longer than middle toe and claw. Length 16 to 16.50 inches; extent 32 to 33; wing about 11; tail about 7.

Hab.—Washington Territory and northwestern coast.

This fish-crow frequents the coast and inlets of this Territory in large numbers, and is much more gregarious and familiar than the common crow. Otherwise it much resembles that bird in habits, being very sagacious, feeding on almost everything animal and vegetable, and having nearly the same cries, differing rather in tone than character. Its chief dependence for food being on the sea, it is generally found along the beach, devouring dead fish and other things brought up by the waves. It is also very fond of oysters, which it breaks by carrying them upward and dropping again on a rock or other hard material. When the tide is full they resort to the fields or dwellings near the shore and devour potatoes and other vegetables, offal, &c. They, like the gulls, perceive the instant of change of tide, and flocks will then start off together for a favorite feeding ground. They are very troublesome to the Indians, stealing their dried fish and other things, while, from superstitious feelings, the Indians never kill them, but set a child to watch and drive them away. They build in trees near the shore in the same way as the common crow, and the young are fledged in May.—C.

In Oregon and Washington Territories the fish-crow is very abundant, forming one of the marked ornithological features of the country. The great abundance of fish, especially of salmon, throughout both Territories afford an ample supply of food to the species. On Puget

Sound it is very plentiful throughout the year. In winter it subsists principally upon the refuse food and offal thrown out by the natives from their lodges, and is also an attentive hanger on at the residences of the white settlers. It is cunning, but very tame and impudent, allowing a very near approach, and when closely pursued retiring but a short distance. Like some species of gull, this bird is in the habit of carrying clams high in the air and then dropping them, in order to break the shell. In watching one thus employed I was very much amused at the unsuccessful endeavors he made to break the shell of a clam by letting it drop on *soft* ground. He continued for a long time carrying and recarrying the same clam high aloft and fruitlessly dropping it on the prairie sod. He nevertheless persisted perseveringly in his efforts until I became tired of watching him. What the result was I am unable to state.

A nest of this species which I found at Fort Dalles contained three eggs. It was situated in a dense willow thicket near a lagoon on the Columbia. The eggs were about one and a half inch long and very wide in their short diameter, and of a dirty green ground with brown spots.

Prof. Baird, in speaking of the similarity of this species with the *Corvus americanus*, says that "it is almost a question whether it be more than a dwarfed race of the other species." To this I would reply that its habits are too dissimilar to admit the doubt. It is not wary and suspicious like the common crow, but in its impudent familiarity with man closely resembles the English jackdaw, and scarcely learns to be shy even after being annoyed with the gun.—S.

PICICORVUS COLUMBIANUS, Bon.

Clarke's Crow.

Corvus columbianus, WILSON, Am. Orn. III, 1811, 29; pl. xx.—Bon. Obs. Wilson, 1824, No. 38.—IB. Syn. 1828, 57.—NUTTALL, I, 1832, 218.

Nucifraga columbiana, AUD. Orn. Biog. IV, 1838, 459; pl. 362.—IB. Syn. 1839, 156.—IB. Birds Amer. IV, 1842, 127; pl. 235.—Bon. List, 1838.—NUTTALL, Man. I, 2d ed. 251.

Picicorvus columbiana, BONAP. Consp. 1850, 384.—NEWBERRY, P. R. R. Rep. VI, IV, 1837, 83.—BAIRD, Gen. Rep. Birds, p. 573.

"*Corvus megonyx*, WAGLER."

SP. CH.—Tail rounded or moderately graduated, the closed wings reaching nearly to its tip. Fourth quill longest; second considerably shorter than the sixth. General color bluish ash, changing on the nasal feathers, the forehead, sides of head, (especially around the eye,) and chin, to white. The wings, including their inner surface, greenish black, the secondaries and tertials, except the innermost, broadly tipped with white; tail white, the inner web of the fifth feather and the whole of the sixth, with the upper tail coverts, greenish black. The axillars plumbeous black, bill and feet black, iris brown.

Length of male, (fresh,) 12.50 inches; extent, 22.50; wing, 7; tail, 4.30; tarsus, 1.20.

Hab.—From Rocky mountains to Pacific. East to Fort Kearney. Mauvaises Terres of the Upper Missouri.

After crossing the Cascade mountains eastward in 1853, I found the American nutcracker (or Clarke's crow) quite abundant along the banks of the Yakima river, whence it continued common northward wherever the long-leaved pine grows, whose seeds were its principal food. On returning to Vancouver, it appeared during the severe cold winter of January, 1854, in considerable numbers. I have never seen it at any other season west of the Cascade mountains, and think its migration westward is only during the coldest weather. It probably lives during summer very high in the mountains, as the pine and spruce grow nearly to their snow line. It doubtless extends eastward throughout the Territory, as I have shot it at Fort Laramie, Nebraska Territory, and a straggling pair even as far east as Fort Kearney. I have

never seen this bird feed on anything but seeds and berries, and it rarely descends to the ground, never frequenting river banks or other places for dead fish and carrion, like crows. About the tops of the trees it may be seen extracting the seeds from cones; hanging head downwards like the chickadees. Its cry is loud and harsh like the crow's, and its flight rapid and steady, it having much larger wings than the jay. I have had no opportunity of observing its nest, which is probably built in high trees; perhaps burrowed in decayed wood, as with the European species.—C.

I have not myself obtained it on the Pacific side, but I was fortunate enough to get a specimen on Milk river, Nebraska, about 200 miles east of the Rocky mountains. The only bird of the kind I obtained I shot while it was flying past me, and as it was the only bird of the species I have seen I am unable to give any account of its habits.—S.

Sub-Family GARRULINAE.—The Jays.

PICA HUDSONICA, Bonap.

Magpie.

Corvus Pica, FORSTER, Phil. Trans. LXXII, 1772, 382.—WILSON, Am. Orn. IV, 1811, 75; pl. xxxv.—BON. Obs. Wills. 1825, No. 40.—IB. Syn. 1828, 57.—NUTTALL, Man. I, 1832, 219.—AUD. Orn. Biog. IV, 1838, 408; pl. 357. Not of Linnaeus.

Corvus hudsonica, JOS. SABINE, App. Narr. Franklin's Journey, 1823, 25, 671.

Pica hudsonica, BONAP. List, 1838.—IB. Conspectus, 1850, 383.—MAXIM. Reise Nord. Amer. I, 1839, 508.—IB. Cabanis' Journ. 1856, 197.—NEWBERRY, Zool. Cal. & Or. Route, Rep. P. R. R., VI, iv, 1857, 84.—BAIRD, Gen. Rep. Birds, 576.

Cleptes hudsonicus, GAMBEL, J. A. N. Sc. 2d Ser. I, Dec. 1847, 47.

Pica melanoleuca, "VIEILL." AUD. Syn. 1839, 157.—IB. Birds Amer. IV, 1842, 99; pl. 227.

SP. CH.—Bill and naked skin behind the eye, black. General color, black. The belly, scapulars, and inner webs of the primaries, white; hind part of back grayish; exposed portion of the tail feathers glossy green, tinged with purple and violet near the end; wings glossed with green; the secondaries and tertials with blue; throat feathers spotted with white. Length, 19.00; wing, 8.50; tail, 11.00.

HAB.—The Arctic regions of North America. The United States from the High Central Plains to the Pacific, north of California.

This magpie is abundant throughout the central region of Oregon and Washington Territories. On our journey across from the Mississippi I first saw this bird about 100 miles west of Fort Union, the American Fur Company's trading post, at the mouth of the Yellowstone, although one of our hunters told me that he saw one several weeks before in the middle of Minnesota. As we approached the Rocky mountains they became more and more plentiful, until in the mountains themselves, along the borders of streams, they were continually met with. They are almost as abundant as far west as the Cascade mountains. The dense mass of forest here met with affords a pretty effectual barrier to their passage. On Puget Sound, west of these mountains, I did not observe a single bird of this species until August, 1856, after which time, during the fall, they became moderately abundant. They appeared to have crossed over from the east side of the mountains by some of the passes north of Mount Rainier, after the breeding season had ceased in the central section. I obtained two more specimens from Bellingham bay, near the 49th parallel north. An Indian from the northwest coast told me that the species is common at Sitka.

This bird is mischievous and gluttonous, but not so tame or so fond of the society of man as the

European species. They are very much disliked by the frontier traders and mountain men of interior Oregon on account of their vile propensity to alight on the sore backs of broken-down and chafed horses or mules, most unceremoniously picking and feeding upon the raw, sore flesh, notwithstanding the moans, kicks, and rolling of the poor tortured animals. In this manner many disabled beasts have been most irretrievably injured, and probably a vast number even killed. It is said that the mountain men and trappers of former times so hated this bird, on account of its evil propensity for horse flesh, that when one of them possessed but two bullets he was sure to fire *one* at a magpie if he had an opportunity. These birds breed throughout the interior. I obtained a young individual, nearly fledged, about May, 6, 1855, at Fort Dalles.

As with other birds of the genus, carrion affords its principal food. The dead cattle, so numerous along the great Oregon emigrant trail some years ago, afforded them an abundant supply of food during half the year. The species is partially migratory. At Fort Dalles I saw a few magpies staying throughout the winter. The majority of them, however, retire further south during the cold season.

One of the chattering cries of our magpie resembles much a peculiar call uttered by a Steller's jay.

I have never observed the yellow-billed magpie in Oregon.

When in the Rocky mountains I frequently noticed these birds assembling on the trees around us, just before we were to leave our camp. Instinct, or, perhaps, experience, had taught them that on our departure they would have "full swing" at the rinds of bacon and other culinary refuse of the deserted camp.—S.

I first met with the magpie east of the Cascade mountains, near the Yakima, and from there, in our journey northward to the 49th degree, it was common, as well as in all the open unwooded regions, until we again passed the mountains on our return westward. I saw nothing of it at Vancouver during the winter, which was severe enough to cause a migration of several other species of birds towards the coast. In the spring of 1855 I heard that magpies had been on Whitby's island during the winter, but none remained in March. I suppose, therefore, that a few migrate to the westward in winter. I have heard of magpies frequenting the Columbia river at Astoria, and near the mouth of the Willamette, in summer. I have never seen these; but think they may be stragglers of the Californian species, which have followed the plains of the Willamette to its outlet. Both species inhabit open regions, and the dense forests of the lower Columbia must be very ill suited for their resorts. I have never found the magpies on the upper Columbia as familiar as they have been represented to be in winter. In summer they seemed rather shy, frequenting the thickets along streams and being commonly silent.—C.

CYANURA STELLERI, Swainson.

Steller's Jay.

Corvus stelleri, GMELIN, Syst. Nat. I, 1788, 370.—LATH. Ind. Orn. I, 1790, 158.—PALLAS, Zoog. Rosso-As. I, 1811, 393.—BONAP. Zool. Jour. III, 1827, 49.—IB. Suppl. Syn. 1828, 433.—AUD. Orn. Biog. IV, 1838, 453; pl. 362.

Garrulus stelleri, VIEILLLOT, Dict. XII, 1817, 481.—BONAP. Am. Orn. II, 1828, 44; pl. xiii.—NUTTALL, Man. 1, 1832, 229.—AUD. Syn. 1839, 154.—IB. Birds Amer. IV, 1842, 107; pl. 230. Not of Swainson, F. Bor. Amer. ?

Cyanurus stelleri, SWAINSON, F. BOR. AM. II, 1831, 495, App.

Cyanocorax stelleri, BON. LIST, 1838.

Cyanocitta stelleri, CAB. MUS. HEIN. 1851, 221.—NEWBERRY, P. R. R. REP. VI, IV, 1857, 85.

Cyanogarrulus stelleri, BONAP. CONSPECTUS, 1850, 377.

Steller's crow, PENNANT, ARCTIC ZOOLOG. II, SP. 139.—LATH. SYN. I, 387.

Cyanura stelleri, SW. BAIRD, GEN. REP. BIRDS, 1858, p. 581.

SP. CH.—Crest about one-third longer than the bill. Fifth quill longest; second about equal to the secondary quills. Tail graduated; lateral feathers about .70 of an inch shortest. Head and neck all round, and fore part of breast, dark brownish black. Back and lesser wing coverts, blackish brown, the scapulars glossed with blue. Under parts, rump, tail coverts, and wing, greenish blue; exposed surfaces of lesser quills dark indigo blue; tertials and ends of tail feathers rather obsoletely banded with black. Feathers of the forehead streaked with greenish blue. Length, 12.25 inches; extent, 18; wing, 5.85; tail, 5.85; tarsus, 1.75. Iris brown, bill and feet black.

HAB.—Pacific coast of North America; east to St. Mary's Mission, Rocky mountains.

Steller's jay is very common in all the forests of the Territory on both sides of the Cascade mountains. It has much the same habits as the blue-jay of the eastern States, but differs in notes, having a louder and harsher voice. It seems to depend upon the forests chiefly for its food, but in winter visits the vicinity of houses, stealing potatoes and almost anything eatable. During these forages on the garden, made during the early morning, they are very silent and watchful, evidently conscious of the criminality of their actions, and when discovered fly off to the concealment of the forest. They will also visit Indian lodges while the owners are absent, and enter them if possible, one all the time keeping watch. In the forest they are not shy, but often rather boldly follow intruders, screaming and calling their fellows around. Where hazelnuts grow these are a great article of winter food for them. To break the shells they carry them to a branch, and fixing them in a notch of the bark, hammer with their bill till the nut is extracted. In summer they suck bird's eggs, and doubtless often devour young birds. The nest is large, loosely built of sticks, and placed in a bush or tree. I have never seen the eggs, but the young are fledged by the middle of June.—C.

The Steller's jay is, probably, the most abundant bird of its size in all the timbered country between the Rocky mountain divide and the Pacific ocean. It is tame and loquacious, and possessed of a most impudent curiosity. The nickname given to this bird by the Nisqually Indians is "Sky-ky," or *the chief*. It is a hardy, tough bird, and a constant winter resident of Washington Territory. This jay is remarkable for its varied cries and notes, having one for nearly every emotion or pursuit in which it may be engaged. I think it also has a fondness for mimicing the cries of other birds. I have frequently been most pleasantly excited in hopes of obtaining a rare bird, the cry of which I had never heard before, and which was then issuing from some clump of bushes or thicket; but was almost invariably disappointed by finding that the strange notes had issued from this jay. It mimics the principal cry of the *Mimus felivox* perfectly. The males and females of this species are alike in appearance. Two male birds that I skinned in 1856 measured, each, 12 by 17.—S.

NOTE.—The Californian jay (*Cyanocitta californica*) Townsend mentions obtaining on the Columbia river. I have never seen it in either Territory.—S.

PERISOREUS CANADENSIS, Bonap.

Canada Jay.

Corvus canadensis, LINN. Syst. Nat. I, 1766, 158.—FORSTER, Phil. Trans. LXII, 1772, 382.—WILSON, Am. Orn. III, 1811, 33; pl. xxi.—BON. Obs. 1824, No. 42.—AUD. Orn. Biog. II, 1834, 53: V, 1839, 208; pl. 107.

Garrulus canadensis, BON. (Saggio, 1831?) Syn. 1828, 58.—SWAINSON, F. Bor. Am. II, 1831, 295.—NUTTALL, Man. I, 1832, 232.—AUD. Syn. 1839, 155.—IB. Birds Amer. IV, 1842, 121; pl. 234.

Dysornithia canadensis, SWAINSON, F. Bor. Am. II, 1831. Appendix.

Perisoreus canadensis, BON. List, 1838.—IB. Conspectus, 1850, 375.—NEWBERRY, Rep. P. R. R. Surv. VI. iv, 1857, 85.—BAIRD, Gen. Rep. Birds, 590.

SP. CH.—Tail graduated; lateral feathers about one inch shortest. Wings a little shorter than the tail. Head and neck, and fore part of breast, white. A plumbeous brown nuchal patch, becoming darker behind, from the middle of the crown to the back, from which it is separated by an interrupted whitish collar. Rest of upper parts ashy plumbeous; the outer primaries margined, the secondaries, tertials, and tail feathers obscurely tipped with white. Beneath smoky gray. Crissum whitish, iris brown, bill and feet black. Length, 10.70; extent, 16.50; wing, 5.75; tail, 6.00; tarsus, 1.40.

HAB.—Northern America into the northern parts of United States from Atlantic to Pacific; more south in Rocky mountains.

I first saw the Canada jay at the mouth of the Columbia river in March, 1854, when they were in a small scattered flock, industriously seeking insects and seed among the spruce trees, much in the manner of the titmice, occasionally whistling in a loud melodious tone like the cardinal bird. I have always found them near the same place at all seasons, and, having shot a newly fledged young bird there in July, have no doubt they build in the vicinity. I have not observed the bird common in any other locality, but it seems to be well known in the country by the name of "meat bird," as it will watch hunters and pick at the deer or other meat they hang in the woods. They sometimes show great boldness in obtaining their favorite food. I have seen them enter a boat containing several person to steal some salmon roe. It is commonly, however, a shy bird, remaining in the dense forest, where in this Territory it can usually obtain sufficient food. Its notes differ much from the other jays in being clear and musical, and they sometimes show considerable variety of song, though generally they are silent. They seem to prefer the spruce forests along the coast, but I have seen a few at Puget Sound.—C.

The only specimen of the Canada jay seen by me on Puget Sound was obtained at Port Townsend, having been killed in the forest of firs and spruce trees near Point Wilson. I think that it is not a common species at the head of the sound, but prefers the more immediate vicinity of the ocean, probably on account of the different character of the forests there found.

Mr. Robert Kennicott informs me that the vulgar name of this bird, common among hunters, "*Whiskey Jack*," is probably a corruption of its Chippewa name, "*Wiss-ka-chon*," which has been twisted by former "mountain men" into whiskey *John*, and then whiskey *Jack*.—S.

ORDER IV. **RASORES**.—The Scratching Birds.Family **COLUMBIDAE**.—The Pigeons.**COLUMBA FASCIATA**, Say.**Band-tailed Pigeon.**

Columba fasciata, SAY, Long's Exped. R. Mts. II, 1823, 10.—Bon. Amer. Orn. I, 1825, 77; pl. viii.—Is. Syn. 1828, 119.—Is. List, 1838, &c.—BAIRD, Gen. Rep. Birds, p. 597.

Chloroenas fasciata, BONAP. Conspectus, II, 1854, 51.

Columba monilis, VIGORS, Zool. Beechey's Voyage, 1839, 26: pl. x.

SP. CH.—Above olivaceous, tinged with ash, changing on the wing coverts to bluish ash, of which color are the hinder part of the back, rump, and basal portion of the tail. The terminal third of the tail is whitish brown, with a tinge of ash, succeeding a narrow bar of dusky. Head all round, sides of neck and under parts, including tibia, purplish violet; the middle of the abdomen, anal region, and crissum, whitish. Tibia and throat tinged with blue. Quills brown, narrowly margined with white. A conspicuous narrow half collar of white on the nape; the feathers below this to the upper part of the back metallic golden green. Bill and feet yellow; the former black at tip. Iris carmine, bordered with gold color; bill yellow and black; feet yellow.

Female similar, with less purple; the nuchal collar of white obsolete or wanting. Somewhat smaller than the male. Length, 15 to 16.50 inches; extent, 25 to 26; wing, 8.80; tail, 6.10.

Hab.—From Rocky mountains to Pacific coast; south to New Leon, Mexico.

The band-tailed pigeon arrives at Columbia river in April, and frequents all the forests of the Territory until the end of October, when they retire south. They keep about the borders of prairies and clearings, and frequently do much damage to fields of grain, though never found in such immense numbers as the wild pigeon east of the Mississippi. In June they lay two white eggs, about the same size as the house pigeons, on the ground near streams or openings, without constructing any nest. During summer they feed on wild cherries and other fruits, wild peas, which are very abundant, and probably later depend on acorns and hazel nuts. Their cooing is much like that of the common pigeon. I have not seen them east of the Cascade range.—C.

The band-tailed pigeon is a very common bird in Washington Territory, especially west of the Cascade mountains; I saw but one flock containing 5 individuals east of those mountains. In 1856 the first birds of this species that arrived in the spring made their appearance about May 15, which is about the customary time every year for their arrival. One or two individuals are first seen, and within two or three days thereafter the main body of the migration follows. A small number remain throughout the summer and breed; the rest retire further north. Those that remain generally make their nests in thick fir forests near water. They subsist during the summer on wild cherries and other berries, and later in the season, since the country has become settled, upon grain.

About the first week in September large flocks congregate on stubble fields in the vicinity of Fort Steilacoom, and for two or three weeks thereafter their numbers are daily augmented by arrivals from the north. Some flocks of these pigeons that I saw in September, 1856, must have contained at least one thousand individuals. I am told that in the cultivated district on the Cowlitz river, at the same season, they are in still greater numbers. By the 5th of October of the year 1856 all had suddenly disappeared, with the exception of a few stragglers, generally young birds. In flying, the flocks, I think, are not quite as compactly crowded as those of the

passenger pigeon. During the summer, while breeding, their cooing and calls can be heard a long distance. The name of this bird, in the Nisqually language, is "hubboh," a good imitation of its call. The practice is very common among these Indians to name birds and animals from the sound of their calls and cries. Another example of this is the name of the Hutchins goose, "ah-hah," which is repeated once or twice to imitate their "honking."

In the autumn these birds are in excellent order for the table; indeed, I prefer them to the wild pigeon of the Atlantic.—S.

ECTOPISTES MIGRATORIA, Swainson.

Wild Pigeon; Passenger Pigeon.

Columba migratoria, LINNAEUS, Syst. Nat. I, 1766, 285.—GM. I, 389.—FORSTER, Phil. Trans. LXII, 1772, 398.—WILSON, Am. Orn. I, 1808, 102; pl. xlv.—BON. Obs. Wils. 1825, No. 179.—WAGLER, Syst. Av. 1827, No. 91.—AUD. Orn. Biog. I, 1831, 319; V, 561; pl. 62.

Ectopistes migratoria, SWAINSON, Zool. Jour. III, 1827, 355.—IB. F. Bor. Am. II, 1831, 363.—BON. List, 1838.—IB. Consp. Av. II, 1854, 59.—AUD. Syn. 1839, 194.—IB. Birds Amer. V, 1842, 25; pl. 285.—"REICH. Icones Av. tab. 249, figs. 1377, 1379."—BAIRD, Gen. Rep. Birds, p. 600.

[For extended synonymy see Baird's Gen. Rep.]

A bird in immature plumage, which I took to belong to this species, I saw in a clump of choke cherry bushes on a branch of Milk river, near Bear's Paw mountains, Nebraska, about 175 miles east of the main range of the Rocky mountains. I think that the eastern base of the latter chain may be considered their western limit. The country west of these mountains, with the exception of a narrow strip near the Pacific, seems, geographically and botanically, unsuited to the wants of the species.—S.

Townsend mentions the *E. migratoria* as found in "Oregon," but I have never seen or heard of it; though, as I have seen it at Fort Laramie, it may cross the Rocky mountains into the eastern part of the Territory.—C.

ZENAIIDURA CAROLINENSIS, Bonap.

Carolina, or Common Dove.

Columba carolinensis, LINNAEUS, Syst. Nat. I, 1766, 286, No. 37.—GMELIN, I, 787.—LATHAM, Ind. II, 1790, 613.—WILSON, Am. Orn. V, 1812, 91; pl. xliii.—BON. Obs. 1825, No. 159.—AUD. Orn. Biog. I, 1831, 91; V, 1839, 555; pl. 17.—NUTTALL, Man. I, 1832, 626.

Ectopistes carolinensis, RICH. List, 1837.—BONAP. Geog. List, 1838.—AUD. Syn. 1839, 195.—IB. Birds Amer. V, 1842, 36; pl. 286.

Zenaidura carolinensis, BONAP. Consp. Av. II, 1854, 84. Type.—BAIRD, Gen. Rep. Birds, p. 604.

Columba marginata, LINNAEUS, Syst. Nat. I, 1766, 286, No. 40, (best description.)—GMELIN, I, 1788, 791.—WAGLER, Syst. Av. 1827, No. 91.—IB. Isis, 1831, 519.

Ectopistes marginata, GRAY, List, Br. Mus.

? *Ectopistes marginellus*, WOODHOUSE, Pr. A. N. Sc. VI, June, 1852, 104.—IB. Expl. Zuffi & Color. 1853, 93, Birds, pl. v. Canadian river, Ark. Immature bird.

? *Zenaidura marginella*, BONAP. Consp. Av. II, 1854, 85.

SP. CH.—Tail feathers 14. Above bluish, although this is overlaid with light brownish olive, leaving the blue pure only on the top of the head, the exterior of the wings, and the upper surface of the tail, which is even slightly tinged with this color. The entire head, except the vertex, the sides of the neck, and the under parts generally, light brownish red, strongly tinged with purple on the breast, becoming lighter behind, and passing into brownish yellow on the anal region, tibia, and under tail coverts. Sides of the neck with a patch of metallic purplish red. Sides of body and inside of wings clear light blue. Wing coverts and scapulars spotted with black, mostly concealed, and an oblong patch of the same below the ear. Tail feathers seen from below blackish, the outer web of outermost white, the others tipped with the same, the color becoming

more and more bluish to the innermost, which is brown. Seen from above there is the same gradation from white to light blue in the tips; the rest of the feather, however, is blue, with a bar of black anterior to the light tip, which runs a little forward along the margin and shaft of the feather. In the sixth feather the color is uniform bluish, with this bar; the seventh is without bars. Bill black; feet yellow. Female smaller, with less red beneath. Length of male, 12.50 to 12.85; extent, 17.25 to 18; wing, 5.75; tail, 6.70.

Hab.—Throughout the United States, from Atlantic to Pacific; Cuba, Gundlach.

The *Carolina dove* is common about prairies and farms of the interior, and probably some remain all winter in the Territory, though none were at Vancouver in the snowy winter of 1853. They rarely appear along the coast border, but doubtless extend east to the Rocky mountains.—C.

Very abundant throughout both Territories. At Fort Steilacoom this species arrives and departs at about the same time as the *Columba fasciata*. During my residence there I obtained many specimens for comparison with eastern birds.

NOTE.—I noticed a small dove in the Simcoe valley, near the Yakima river, Washington Territory, in June, 1855. It appeared smaller and much *darker* than this species, being of a *dark blue*. I was, unfortunately, unable to obtain a specimen for preservation.—S.

Family TETRAONIDAE.—The Grouse.

TETRAO OBSCURUS, Say.

Dusky Grouse; Blue Grouse; Pine Grouse.

Tetrao obscurus, SAY, Long's Exped. R. Mts. II, 1823, 14.—BON. Syn. 1828, 127.—Sw. F. Bor. Am. II, 1831, 344; pl. lix, lx.—NUTTALL, Man. I, 1832, 666.—AUD. Orn. Biog. IV, 1838, 446; pl. 361.—IB. Syn. 1839, 283.—IB. Birds Amer. I, 1842, 89; pl. 295.—BAIRD, Gen. Rep. p. 620.—NEWBERRY, Rep. P. R. R. Surv. VI, IV, 1857, 93.

Canace obscura, BONAP. Comptes Rendus, XLV, 1857, 428.

Tetrao richardsonii, DOUGLAS, Trans. Linn. Soc. XVI, 1829, 141.

SP. CH.—Sexes dissimilar. Tail of twenty feathers. Above bluish black; plumbeous or black beneath. Tail uniform black, and finely and obscurely mottled above. Tail broadly tipped with light slate. Beneath uniform plumbeous. A dusky half collar on the throat. The chin and throat above white, varied with black. Tail about two-thirds the length of the wings, broad, rounded, composed of twenty broad, even, and truncated feathers. Tarsi feathered to the toes, the feathers extending along the sides of the basal half of the first joints of the toes. Pectinations on the sides of the toes very short. Length, 20.40; wing, 9.40; tail, 7.45.

Hab.—Black Hills of Nebraska to Cascade mountains of Oregon and Washington.

The dusky or "blue grouse," as it is called in the western country, is common in most of the forests of the Territory, though rather in the dense spruce forests near the coast. As it rarely appears on the open prairie, it is difficult to start, and still more so to find, if, as usual, it alights on a tree. So perfectly motionless does it sit, that though one may be looking straight at it he will probably mistake it for a knot or a bunch of leaves. I have often searched carefully every branch, and after concluding that the bird was not there, and starting to go, had the satisfaction of seeing it sail off from the very same tree towards some distant part of the forest. During May, near the coast, and until August, on the mountains, the low tooting of this grouse is heard everywhere, sounding something like the cooing of a pigeon, and in the same deep tone as the drumming of the ruffed grouse. It has the power of ventriloquism, so that while the bird may be sitting in a tree overhead the sound seems to come from places quite distant. I have not seen the nest or eggs, but in June flocks of half-grown young are murdered by the Indians near Puget Sound. In winter they are so rarely seen west of the mountains that the

people think they must keep entirely in the trees. In October, 1853, I saw, however, a flock, running through the snow, near the Spokane plains, and one of them was shot; but I have never seen them since then in winter.—C.

This bird, called generally in Oregon the *blue* grouse, also known as pine grouse, dusky grouse, &c., I met, for the first time, when our exploring party reached the main chain of the Rocky mountains, where we found it exceedingly abundant, but not more so than in the Blue mountains of Oregon, Cascade mountains, and in all the timbered country between the last mentioned range and the Pacific coast. In the autumn, about November 15, they generally disappear, and it is rare, indeed, to see a single individual of the species during the interval between that period and about March 20 of the following year. Concerning the whereabouts of this bird during the winter there are many opinions among the settlers. Some maintain that the species is migratory, and that they retire to the south, while others say that they repair to the tops of the highest evergreen trees, where, in the thickest foliage of the branches, they pass the cold season in a state of semi-torpor, rarely or never descending until warm weather comes on. As they subsist well on the leaves of the coniferae, and can always obtain sufficient water from the snow and rain drops on the leaves to supply their necessities, I have but little doubt that this latter is the correct account, or that, if migratory, they are but *partially* so. I saw one bird of this species on the ground, during a fall of snow, in January 1854, near the Nisqually river, Washington Territory; and I have been told that a man, near Olympia, Washington Territory, whose *eye-sight* is excellent, is able any day during winter to obtain several birds by searching carefully for them in the tree tops of the tallest and most thickly leaved firs. This requires eye-sight of much greater power than most men possess. Even in the summer, when these birds are generally lower in the trees, it is very difficult to find them among the dense branches. They have, in addition to their sombre hues, the advantage of their habit, of crowding very closely to the limbs, and of sitting almost immovably for hours.

The first indication, in the spring, of their arrival? or activity? is the courting call of the male. This call is a prolonged noise, sounding much like the whir of a rattan cane whirled suddenly through the air. It is repeated quickly several times, and then stops for a brief interval. This noise is said to be produced by inflating and contracting a couple of sacks on each side of the throat, which are for the most part concealed when collapsed, and are covered by an orange-yellow, thick, corrugated, unfeathered skin. These birds, at Fort Steilacoom, are very abundant throughout the spring and early summer. They are there mostly confined to the forests of fir trees, (*ABIES DOUGLASSII*.) Late in the season, after hatching, they may be found generally at mid-day on the ground, in search of berries, seeds, &c. When alarmed they almost invariably seek safety among the dense foliage of the trees, instinctively appearing to understand the advantages of thus hiding. In the autumn they are more generally found on the ground, feeding on sallal and other berries. One day, in October, 1856, I saw on the Nisqually plains, amongst fern and grass, five of these birds, full grown, and in excellent order. A man killed the whole five, one by one, with a double-barrelled gun, without an attempt being made by a single individual to fly. This grouse is a very fine table bird; the little dash of *pine taste* its flesh possesses only adding to its game flavor. I have known males, in June, weighing three and a half pounds, although they rarely exceed two and three-fourths pounds.

By August 1 the young are generally half grown. They are then easily killed on the wing, and are excellent for the table.

George Gibbs, esq., in a letter to me, says: "The apparatus with which the blue grouse

produces the singular hooting, with which the male solaces his lonely hours, is worthy of dissection and study. I have seen this bird as far south as the Russian River mountains in California. It is common on the east side of the Cascades, as far north as the 49th parallel."—S.

TETRAO FRANKLINII, Douglas.

Franklin's Grouse; Tyee Grouse.

Tetrao franklinii, DOUGLAS, Trans. Linn. Soc. XVI, 1829, 139.—RICH. F. BOR.-AM. II, 1831, 348; pl. lxi.—BAIRD, Gen. Rep. Birds, p. 623.

Tetrao canadensis, var. BONAP. Am. Orn. III, 1830, 47; pl. xx.

? *Tetrao fusca*, ORD, Guthrie's Geog. 2d Am. ed. II, 1815, 317. Based on small brown pheasant of Lewis & Clark, II, 182, which very probably is this species.

SP. CH.—Tail of sixteen feathers. Feathers above distinctly banded with plumbeous; beneath uniform black, with a pectoral band of white. Chin and throat above black, the tail feathers entirely black, without orange brown terminal band; the upper tail coverts broadly tipped with white. Wing, 7.35; tail, 5.62.

Hab.—Northern Rocky mountains, and west.

Abundant in the Rocky and Bitter Root mountains, also found in the Cascade mountains, Washington Territory, near the Yakima Passes. This bird, by the Indians, has the jargon name, "Tyee Kulla-Kulla" or the "chief bird," or perhaps more correctly the *gentleman bird*.

Washington Territory contains five of the species of *Tetrao* or tail grouse known to exist in North America, the only species not found within its limits being the *Tetrao cupido* or pinnated grouse, the *Bonasa umbellus*, and, if distinct, the *Tetrao canadensis*. Of the five native species there is not one but can be said to be plentiful in some portion of the Territory. In the interior arid regions the species *urophasianus* and *phasianellus* abound, the first being only found in that region, the others extend into the Rocky mountain valleys. In the extreme east *T. franklinii*, *T. obscurus*, and *Bonasa sabinii* are plentiful, whereas in the extreme west but the two last mentioned. In the western section, owing to the abundance of food, thick covers, and absence of foxes, it is probable that both species will always remain numerous.

As may be inferred from this notice of their limits, all the five species of grouse may be found within a few miles of Fort Dalles on the Columbia, besides, perhaps, a Ptarmiigan near the limits of perpetual snow on the sides of Mount Hood.

The specimens of *Tetrao franklinii*, sent by me to the Smithsonian, were obtained by Lieutenant John Mullan, United States army, at the St. Mary's valley in the Rocky mountains. Lieutenant Mullan stated to me that they were quite an abundant bird in that region, and very readily killed, as they are tame and unsuspicious. The skins were thrown in alcohol, but, unfortunately, in drying became much damaged.—S.

Mr. George Gibbs, in a letter to me, speaks as follows of a grouse shot by him, which probably belonged to this species:

"I should mention that in November, 1849, I shot a bird on the Willamette valley much resembling the hen of the ruffed grouse, but not more, at most, than two thirds the size. I could not identify it by any description in Nuttall's Manual, and had no means of preserving the skin. It seemed in adult plumage; had no ruff. I did not ascertain the sex, but suppose it to be a female; I have never since met with a similar bird."

Again he says: "Mr. Bolon (an old resident in the Territory) says that there is a grouse on the tops of the Cascade mountains, near Rainier, less than the ruffed grouse, but the same color, has no ruff. It is a shorter bird than the sharp-tailed, but stout in proportion. The eyelids and wattles on the neck, *bright red*, where in the blue grouse they are yellow. Abundant and very tame. The Indians call them the *tyee* grouse."

CENTROCERCUS UROPHASIANUS, Swainson.

Sage Cock; Cock of the Plains.

Tetrao urophasianus, BONAP. Zool. Jour. III, Jan. 1828, 214.—IB. Am. Orn. III, 1830; pl. xxi, f. 1.—IB. Mon. *Tetrao*, in Trans. Am. Phil. Soc. N. S. III, 1830, 390.—DOUGLAS, Trans. Linn. Soc. XVI, 1829, 133.—NUTTALL, Man. I, 1832, 666.—AUD. Orn. Biog. IV, 1838, 503; pl. 371.—IB. Syn. 205.—IB. Birds Amer. V, 1842, 106; pl. 297.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. Surv. VI, IV, 1857, 95.

Tetrao (Centrocercus) urophasianus, Sw. F. Bor. Am. II, 1831, 358; pl. lviii.

Centrocercus urophasianus, JARDINE, Game birds, Nat. Lib. Birds, IV, 140; pl. xvii.—BAIRD, Gen. Rep. Birds, p. 624.

?? *Tetrao phasianellus*, ORD, Guthrie's Geog. 2d Am. ed. II, 1815, 317, based on Lewis & Clark, II, 181.

Cock of the plains, LEWIS & CLARK, II, 180, sp. 2.

SP. CH.—Tail feathers twenty. Above varied with black, brown, and brownish yellow; coverts having all the feathers streaked with the latter. Beneath black; the breast white; the upper feathers with spiny shafts; the lower streaked with black; tail coverts with white tips; the sides also with much white. Length 29; wing, 11.30; tail, 11.50. Female much smaller. Iris brown.

Hab.—Sage plains of the northwest.

The *cock of the plains*, known as sage fowl in this Territory, is common on the high, barren hills and deserts east of the Cascade mountains, being limited in its range, apparently, by the growth of the bitter and turpentine-flavored *Artemisia tridentata* or "wild sage," as it is improperly called. The leaves of this shrub seem to be a principal part of its food, and the flesh tastes so strong of it that it is quite unpalatable, though white and tempting as a turkey's. We saw none of these birds north of the Spokane plains, the country being, apparently, too woody for them. On those plains they were common, for though level the surface is dry, sterile, and elevated nearly a thousand feet above the sea.

The flight of this species is more heavy and less noisy than that of most grouse, and, when they are started, commonly extends a long distance without alighting.—C.

Sage cock are abundant on the sage plains of Oregon, near Snake river, on both sides of the Blue mountains. They are also found along the line of the Columbia, on the open plains, and, again, on the sage barrens of the Yakima and Simcoe valleys, in Washington Territory, about latitude 46° and 47° north. In fact, wherever "sage" (*artemisia*) abounds this bird is found. I have dissected these grouse in situations where there was abundance of grass seeds, wild grain, grasshoppers, and other kinds of food that a person would imagine would be readily eaten by them, yet I have failed to obtain a single particle of any other article of food in their full stomachs than the leaves of the *artemisia*. This food must either be highly preferred, or else be essential to their existence. They seem to have the faculty of doing a long time without water, as I have found them in habitually dry, desert situations, during severe droughts, a long distance from water. The flesh of this bird is rather strong and bitter, from the nature of its food, and it also quickly decomposes after death. It, however, is very grateful to the palates of those that have been subsisting long on salt provisions.

I found this bird most abundant on the southern slope of the Blue mountains in the vicinity of Powder river. Here there are immense desert sage plains, well adapted to the species in every respect. The bird hides well, and lies close, frequently allowing a man's approach to within a few feet.

Lieutenant Fleming, of the United States army, informs me that it is found about twelve miles west of Fort Laramie, but is not seen east of that point, at least so far south. Its

geographical distribution, as far east as Milk river, Nebraska Territory, must be by following the line of the Black Hills, and eastern base of the Rocky mountains, from the South Pass northward.

In August, 1853, a sage cock was shot by a member of our party on the Milk river, two hundred miles west of Fort Union, Nebraska, and about the same distance east of the Rocky mountains. He was a fine bird, but so much injured in shooting that I did not attempt to preserve the skin, being in hopes of obtaining another. In this I was disappointed. The general hue of plumage was decidedly more red than that of those I have seen from the Oregon plains.

I observed a small flock of these birds on the plains, bordering the Milk river. In gait and actions they resembled *turkeys*, but were considerably smaller. Mr. Gibbs, in a note to me, says: "Nuttall is wrong on two points concerning the sage cock, in his appendix to the second edition of his volume on water birds. He says the 'tail is somewhat rounded,' whereas it is *sharp*. Also that it is not found east of the Rocky mountains. I have seen them near Fort Laramie on the Platte. In fact, wherever there is 'sage' (*artemesia*) you may look for sage fowls."—S.

PEDIOCAETES PHASIANELLUS, Baird.

Sharp-tailed Grouse.

Tetrao phasianellus, LINNAEUS, Syst. Nat. I, ed. 10, 1758, 160. (Not in 12th edition.)—FORSTER, Phil. Trans. LXII, 1772, 394, 495.—GMELIN, Syst. Nat. I, 747.—LATHAM, Ind. Orn. II, 635.—ORD, Guthrie's Geog. 2d Amer. ed. II, 1815, 317.—BON. Syn. 1828, 127.—IB. Amer. Orn. III, 1828, 37; pl. xix.—NUTTALL, Man. I, 1832, 669.—AUD. Orn. Biog. IV, 1838, 569; pl. 382.—IB. Syn. 1839, 205.—IB. Birds Amer. V, 1842, 110; pl. 298.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. Surv. VI, iv, 1857, 94.

Tetrao (Centrocercus) phasianellus, SWAINSON, F. Bor. Am. II, 1831, 361.

Centrocercus phasianellus, JARDINE, Game Birds, Nat. Lib. Birds, IV, 136; pl. xvi.—BONAP. Comptes Rendus, XLV, 1857, 428.

? *Phasianus columbianus*, ORD, Guthrie's Geog. 2d Am. ed. II, 1815, 317; based on the Columbia pheasant of Lewis & Clark, II, 180.

Tetrao urogallus, Var. β . LINN. Syst. Nat. ed. 12th, 273.

Pediocaetes phasianellus, BAIRD Gen. Rept Birds, p. 626, in which see extended synonymy.

SP. CH.—Tail of eighteen feathers. Colors, white, black, and brownish yellow. Above with transverse bars; the wings with round white spots. Beneath pure white, with dark V-shaped blotches on the breast and sides. Length, 18.00; wing, 8.50; tail, 5.24.

HAB.—Northern prairies and plains, from Wisconsin to Cascades of Oregon and Washington.

The same day the exploring party of Captain McClellan left the forests of the Cascade mountains, and with them the region of the ruffed and blue grouse, we met with flocks of the sharp-tailed grouse and the cock of the plains, which our western men called "prairie hen" and "sage fowl." The sharp-tail, confounded by emigrants with the pinnated grouse of the Mississippi valley, is found in this Territory only in the low alluvial prairies of the streams emptying into the Columbia east of the Cascade mountains. There we found them in flocks of several hundreds, which would start irregularly from the long grass, and after flying a few rods again light in it. When heavy frosts and snow began, near the 49th degree, they would fly to the tops of the trees in the early morning to warm themselves, often ascending to the tops of pines a hundred feet high. They shun high grounds and forests entirely, and within a distance of half a mile I have seen both this and the blue grouse (which avoids open plains altogether) as I passed from prairie to forest. The only cry I have heard them utter was a cackle when suddenly started from the ground. Their wings make a loud whirring, as among others of the genus.—C.

This bird replaces the pinnated grouse in the western country. We first noticed the species in Nebraska, near Fort Union, at the mouth of the Yellowstone river. From that point to the Cascade mountains of Oregon and Washington Territories the species is exceeding abundant wherever there is open country and a sufficiency of food. In certain places they are in great numbers in the autumn, congregating in large flocks, especially in the vicinity of patches of wild rye, and more recently near settlements where there are wheat stubbles. They resemble the pinnated grouse in habits, and are good both for the table and for sport. In places where they are numerous they may frequently be found on cold mornings in the autumn or early winter perched on fences or leafless trees, sunning themselves in the early sunlight.

At Fort Dalles, on the 1st of April, 1855, a young bird scarcely two days old was brought to me. This early incubation would lead us to suspect that the species, in favorable situations, has two or more broods during the season. The young bird above mentioned was confided to the matronly care of a hen with a young brood of chickens, but the young grouse, not understanding the kindness of its foster parent, ran and hid itself as soon as possible, and probably perished that very night from cold.

The settlers on the Upper Columbia speak of a "gray grouse," which is probably nothing else than the full-grown young of the present species in their first plumage.—S.

NOTE.—I have occasionally heard of a grouse which "turns white in winter" that is said to be found on Mount Rainier, one of the lofty snow peaks of the Cascade range. Dr. Townsend also mentions a Ptarmigan in his list of Oregon birds. All the efforts of myself and friends have thus far proved unsuccessful in obtaining a specimen.—S.

BONASA SABINII, Baird.

Oregon Grouse.

Tetrao sabinii, DOUGLAS, Trans. Linn. Soc. XVI, 1829, 137.—RICH. F. BOR. Am. II, 1831, 343.—BAIRD, Gen. Rep. Birds, p. 631.

? *Tetrao umbellus*, RICH. F. BOR. Am. II, 1831, 342.—NEWBERRY, Zool. Cal. & Or. Route; Rep. P. R. R. Surv. VI, iv, 1857, 94.

CH.—Tail of eighteen feathers; dark brown above; the back with cordate spots of lighter. Beneath whitish, transversely barred with brown. Tail tipped with gray, and with a subterminal bar of black. Broad feathers of the ruff black. Similar to *B. umbellus*, but much darker. Middle toe longer. Length about 18 inches; wing, 7.30; tail, 6.70.

Hab.—Rocky mountains to Pacific coast of Oregon and Washington; only in the timbered regions.

The ruffed grouse, partridge, or pheasant, as it is most commonly called in this Territory, is very abundant everywhere about the borders of woods and clearings. It is common near the forests east of the Cascade mountains up to the 49th degree. These birds vary considerably in plumage there, a pale grayish hue predominating; while west of the mountains they are all of a very dark brown. There seems, however, to be no difference in their habits or cries from those of the same bird elsewhere.—C.

The western ruffed grouse is abundant in the timbered districts throughout Washington and Oregon Territories. In habits they are identical with the same bird east. Owing to the mildness of the season in the vicinity of Fort Steilacoom the males commence drumming as early as January, and in February I have heard them drumming through the *whole night*. In autumn these grouse collect in great numbers in the crabapple thickets, near the salt marshes, at the mouths of the rivers emptying into Puget Sound. Here they feed for about six weeks on the ripe fruit of the northwestern crabapple, the *Pyrus rivularis* of Nuttall.—S.

Family PERDICIDAE.—The Partridges.

OREORTYX PICTUS, Baird.

Plumed Partridge; Mountain Quail.

Ortyx picta, DOUGLAS, Trans. Linn. Soc. XVI, 1829, 143.

Callipepla picta, GOULD, Mon. Odont. pl. xv.—NEWBERRY, Rep. P. R. R. VI, IV, 1857, 93.

Ortyx plumifera, GOULD, Pr. Zool. Soc. V, 1837, 42.—AUD. Syn. 1839, 200.—IB. Birds Amer. V, 1842, 69; pl. 291.

Perdix plumifera, AUD. Orn. Biog. V, 1839, 220; pl. 422.

Lophortyx plumifera, NUTTALL, Man. I, 2d ed, 1840, 791.

Oreortyx pictus, BAIRD, Gen. Rep. Birds, p. 642.

SP. CH.—Head with a crest of two straight feathers, much longer than the bill and head. Anterior half of the body grayish plumbeous; the upper parts generally olivaceous brown, with a slight shade of rufous, this extending narrowly along the nape to the crest. Head beneath the eyes and throat orange chestnut, bordered along the orbits and a short distance behind by black, bounded anteriorly and superiorly by white, of which color is a short line behind the eye. Posterior half of the body beneath white, a large central patch (anteriorly bifurcating behind) with the flanks and tibial feathers orange chestnut brown, the sides of body showing black and white bands, the former color tinged with chestnut. Under tail coverts black, streaked with orange chestnut. Upper tertials margined internally with whitish.

Length, 10.50 inches; wing, 5; tail, 3.25.

Hab.—Mountain ranges of California and Oregon towards the coast.

The Oregon quail, or plumed partridge, is very rare in Washington Territory, a few small coveys only being found about Vancouver, as I was informed by the officers of the garrison in 1853. I never succeeded in finding them, though I hunted for them several times with a dog. They seem to become common south of the Columbia towards the prairies of the Willamette. I inquired especially for them in other parts of the Territory, but never heard of them. In California, south of San Francisco, this quail seems to be a rare curiosity to the market hunters, one or two sometimes occurring among flocks of the California quail, and known by the name of "mountain quail."—C.

According to Audubon and Townsend this bird inhabits Oregon. A few quail have been introduced from the Willamette valley upon the prairies back of Fort Vancouver, where, I am told, they are multiplying rapidly. A very little care at first and Washington Territory might be well stocked with these excellent game birds, as the absence of foxes west of the Cascade mountains, and the very mild, open winters generally experienced, leads us to hope that, after a fair start, they will, in all probability, never be exterminated.—S.

LOPHORTYX CALIFORNICA, Bonap.

California Quail.

Tetrao californicus, SHAW, Nat. Misc. pl. 345, (prior to 1801.)

Perdix californica, LATHAM, Synopsis Suppl. Ind. Orn. II, App. 1801, p. lxii.—AUD. Orn. Biog. V, 1839, 152; pl. 413.

Ortyx californica, STEPHENS in Shaw's Zool. XI, 1819, 384.—JARDINE, Game Birds, Nat. Libr. IV, 104; pl. xi.—

Cuv. R. An. Illust. ed. Oiseaux, pl. lxiv.—BENNETT, Gardens & Menag. Zool. Soc. II, 29,

woodcut.—AUD. Syn. 1839, 199.—IB. Birds Amer. V, 1842, 67; pl. 290.

Perdix (Ortyx) californica, BONAP, Syn. 1828, 125.

Lophortyx californica, BONAP. List, 1838.—NUTTALL, Man. I, 2d ed. 1840, 789.—BAIRD, Gen. Rep. Birds, p. 644.

Callipepla californica, GOULD, Mon. Odont. pl. xvi.—REICHENBACH, Av. Syst. 1850, pl. xxvii.—NEWBERRY, Rep.

P. R. R. VI, IV, 1857, 92.

SP. CH.—Crest black. Anterior half of body and upper parts plumbeous; the wings and back glossed with olive brown. Anterior half of head above brownish yellow, the shafts of the stiff feathers black; behind this is a white transverse band

which passes back along the side of the crown ; within this white, anteriorly and laterally, is a black suffusion. The vertex and occiput light brown. Chin and throat black, margined laterally and behind by a white band, beginning behind the eye. Belly pale buff anteriorly, an orange brown rounded patch in the middle, and white laterally, the feathers all margined abruptly with black. The feathers on the sides of body like the back, streaked centrally with white. Feathers of top and sides of neck with the margins and shafts black. Under tail coverts buff, broadly streaked centrally with brown.

Female similar, without the white and black of the head ; the feathers of the throat brownish yellow, streaked with brown. The buff and orange brown of the belly wanting. The crest short.

Length, 9.50 inches ; wing, 4.32 ; tail, 4.12.

Hab.—Plains and lowlands of California and Oregon towards the coast. Mohave river. Puget Sound, W. T. (Introduced.)

I have some doubts whether the quail found at Fort Vancouver do not belong to this species; never having examined birds from that locality, I can throw no light on the subject.

The present species, however, *does exist on the prairies near Puget Sound*, but has only been resident there since the spring of 1857, at which time, through the commendable liberality of Gov. Charles H. Mason, and of Hugh Allen Goldsborough, esq., two lots were imported from San Francisco and turned loose upon the gravelly plains near Olympia, the capital of the Territory.

I have heard subsequently only concerning the Goldsborough flock, which, consisting originally of nine individuals, of whom but four were females, had increased by the next winter to a covey of nearly a hundred individuals.

NOTE.—Mr. Geo. Gibbs writes: "The crested quail cannot be considered as an inhabitant of Washington Territory, as they are very rarely seen north of the Columbia river, and then, I believe, only at Fort Vancouver. I have never seen any east of the Cascade mountains. I met great numbers of the common California species (*L. californica*) on Russian river in 1851, and saw them again on the Klamath in 1852. They were very tame, and took to the bushes when disturbed, perching on the limbs. Like the sharp-tailed grouse they gather in large flocks. This is the case even when young, and it has been doubted whether several females do not belong to one male, and with their broods all run together.—S.

CHAPTER II.
WATER BIRDS, BY DR. G. SUCKLEY, U. S. A.

ORDER V. GRALLATORES. Wading Birds.

Family GRUIDAE. The Cranes.

GRUS CANADENSIS, (Linn.) Temm.

Sand-hill Crane; Brown Crane.

Ardea canadensis, LINN. Syst. Nat. I, 1766, 234, No. 3.—GMELIN, I, 1788, 620.—FORSTER, Phil. Trans. LXII, 1772, 382, No. 36. Severn river.

Grus canadensis, "TEMMINCK." SW. F. BOR. AM. II, 1831, 273.—NUTTAL, MAN. II, 1834, 38.—BON. CONSP. II, 1855, 98.—GUNDLACH, CAB. JOUR. IV, 1856, 339.—BAIRD, GEN. REP. BIRDS, 1858, 655.

Grus pratensis, BARTRAM, Travels in Florida, 1791.

Grus americana, AUD. ORN. BIOG. III, 1835, 441; pl. 261.—IB. BIRDS AMER. V, 1842, 188; pl. 314. (Supposed young.)

SP. CH.—Bill compressed. Lower manible not as deep towards the tip as the upper. Gonys nearly straight; in the same line with the basal portion of bill. Commissure decidedly curving from beyond the middle to the tip, where it is even, not crenated. Color bluish gray; the primaries and spurious quills dark plumbeous brown; the shafts white. Cheeks and chin whitish. Entire top of head (bounded inferiorly by a line from commissure along the lower eyelid) bare of feathers, warty and granulated, thinly beset with short scattered black hairs. Feathers of occiput advancing forward in an obtuse angle; the gray feathers along this point, and over the auricular region, tinged with plumbeous. Length, 48; wing, 22; tarsus, 10; commissure, 6.

HAB.—Whole of western region of United States. Florida.

Sand-hill cranes are very abundant on the Nisqually plains, Puget Sound, in autumn. They there commence to arrive from their summer breeding grounds about the last week in September, from which time until about the 10th of November, they are quite plentiful. After this they disappear; probably retiring to warmer latitudes during the cold months. In the fall they are found on *all* the prairies near Fort Steilacoom, but are not indifferent to choice of certain spots by preference. These are generally old "stubble fields," or spots of ground that have formerly been ploughed. They rise heavily and slowly from the ground upon being disturbed, and flying in circles at length acquire the desired elevation. When proceeding from one favorite resort to another, or when migrating, their flight is high, and not unfrequently their approach is heralded before they are in sight by their incessant whooping clamor. While feeding they are generally silent. The flesh of this species is excellent for the table, and, as Mr. Nuttall observes, much resembling that of the swan in flavor. A young bird, probably of this species, was brought to me in Minnesota as early as June 15. In the vicinity of Fort Steilacoom only stragglers remain to breed. During their migrations they fly in companies of from three to four individuals to several dozens. I have rarely seen them in greater numbers together; company after company succeeding each other, but rarely intermingling—keeping up, as it were, a distinct family organization.—S.

The brown crane is a common summer resident, arriving at the Straits of De Fuca in large

flocks in April, and then dispersing in pairs over the interior prairies to build their nests, which are placed among the tall fern on the highest and most open ground, where they can see the approach of danger. They frequent, at this season, the mountains to the height of 6,000 feet above the sea. The young are often raised from the nest by the Indians for food.—C.

Family ARDEIDAE. The Herons.

ARDEA HERODIAS, Linnaeus.

Great Blue Heron, or Crane.

Ardea herodias, LINN. Syst. Nat. I, 1766, 237, No. 15.—WILSON, Am. Orn. VIII, 1814, 28; pl. lxx.—BON. Obs. 1825, No. 188.—NUTT. Man. II, 1834, 42.—AUD. Orn. Biog. III, 1835, 87; V, 599; pl. 211.—IB. Syn. 1839.—IB. Birds Amer. VI, 1843, 122; pl. 369.—BP. Consp. II, 1855, 112.—BAIRD, Gen. Rep. Birds, 1858, 668.

Large crested heron, CATESBY, Car. App. pl. x.

SP. CH.—Lower third of tibia bare. Above bluish ash; edges of wing and the tibia rufous. Neck cinnamon brown. Head black, with a white frontal patch. Body beneath black, broadly streaked on the belly with white. Crissum white. Middle line of throat white, streaked with black and rufous. Length, 42 inches; wing, 18.50; tarsus about 6.50; bill about 5.50.

Hab.—Throughout the entire territory of the United States; West Indies.

This heron is quite abundant at Puget Sound, where it is called by the Nisqually Indians "sbuck-ah," and likewise has applied to it the nickname of "tsah-pah," or "our grandfather," probably owing to the grave dignity with which the creature struts about on the shores of its favorite feeding grounds. The Indians above mentioned have an amusing tradition concerning this bird, according to which it appears that he formerly was an Indian, who having quarreled with his wife, (the present *Podiceps cornutus*,) they were both transformed by a superior power, the man becoming a heron, the woman a dabchick. The latter was a terrible strumpet, and seems to have been especially punished for her manifold sins by *Dokweebottle*, the Nisqually Jupiter.—S.

The great blue heron is abundant throughout the year near the coast, and near the mouth of the Columbia I have seen flocks of two hundred in August, which had congregated to devour the herring, common at that season. They build also in high trees near the same place.—C.

BOTAURUS LENTIGINOSUS, (Montagu,) Stephens.

Bittern; Stake-driver.

Ardea lentiginosa, MONTAGU, Orn. Dict. Suppl. 1813.—JENYNS, Man. 191.—AUD. Syn. 1839, 262.—IB. Birds Amer. VI, 1843, 94; pl. 365.—SW. F. Bor. Am. II, 1831, 374.

Botaurus lentiginosus, STEPH. Shaw's Gen. Zool. XI, 1819, 596.—BAIRD, Gen. Rep. Birds, 674.

Ardea (Botaurus) lentiginosa, NUTT. Man. II, 1834, 60.

Ardea minor, WILSON, Am. Orn. VIII, 1814, 35; pl. lxx.—BON. Obs. 1825, 186.—AUD. Orn. Biog. IV, 1838, 296 pl. 337.

Botaurus minor, BONAP. List, 1838.—IB. Consp. II, 1855, 136.—GUNDLACH, Cab. Journ. IV, 1856, 346.

SP. CH.—Brownish yellow, finely mottled and varied with dark brown and brownish red. A broad black stripe on each side the neck, starting behind the ear. Length, 26.50; wing, 11.00; tarsus, 3.60; bill above, 2.75.

Hab.—Entire continent of North America.

Rather widely distributed. One specimen obtained in the Rocky mountains at Fort Owen,

in the St. Mary's valley, W. T.; one seen in San Francisco; and another was preserved by me which was killed on Puget Sound. As far as my observation proves, it is not a common bird on the northwest coast.

The specimen obtained by me at Fort Steilacoom is now contained in the Smithsonian collection, numbered 9468. The bill of this bird was *yellowish green*, dusky above. Feet and legs yellowish green.—S.

NYCTIARDEA GARDENI, (Gmel.) Baird.

Night Heron.

Ardea gardeni, GMELIN, I, 1788, 644.

Nycticorax gardeni, "JARD." BONAP. Consp. II, 1855, 141.

Ardea nycticorax, WILSON, Am. Orn. VII, 1813, 101; pl. lxi.—BON. Obs. Wils. 1825, No. 193.—AUD. Orn. Biog. III, 1835, 275; V, 600; pl. 236.—IB. Syn. 261.—IB. Birds Amer. VI, 1843, 82; pl. 363.

Ardea (Botaurus) discors, NUTT. Man. II, 1834, 54.

Nyctiardea gardeni, BAIRD, Gen. Rep. Birds, 678.

SP. CH.—Head above and middle of back steel green. Wings and tail ashy blue. Under parts, forehead, and long occipital feathers, white. Sides tinged with lilac. Length, about 25 inches; wing, 12.50; tarsus, 3.15; bill above, 3.10.

Hab.—United States generally.

This bird is mentioned by Dr. Townsend as inhabiting Oregon. While on Puget Sound I have several times thought that I recognized its cry during the night time. These sounds, whatever it was that produced them, occasioned much fright among the Indians, who believe that the creature that utters them has the power of transforming human beings into inferior animals. They have also several traditions and superstitious stories concerning this, to them, horrible bird. I was unable to obtain a specimen of it during my stay in that region, but upon my arrival in San Francisco I found that it was quite abundant on the Pacific coast, and one or more specimens are contained in every collection of birds I inspected in that city. Several of these were in most elegant condition of plumage, the pendant white pencillated feathers of the head, characteristic of the species, being, in several specimens, from six to nine inches in length.—S.

I have not met with the night heron in this Territory, though, as it is common in California, it probably migrates to the Columbia river, where Townsend seems to have found it.—C.

Family CHARADRIIDAE. The Plovers.

CHARADRIUS VIRGINICUS, Borck.

Golden Plover; Bull-head.

Charadrius pluvialis, WILSON, Am. Orn. VII, 1813, 71; pl. lix.—SW. F. Bor. Am. II, 1831, 623.—NUTTALL, Man. II, 1834, 16.—AUD. Orn. Biog. III, 1835, 623. (Not of Linnæus.)

Charadrius virginicus, "BORCKHAUSEN and BECHSTEIN." LICHT. Verz. Doubl 1823, No. 729.—BAIRD & CASSIN, Gen. Rep. Birds, 690.

Charadrius marmoratus, WAGLER, Syst. Av. 1827, No. 42.—AUD. Orn. Biog. V, 1839, 575; pl. 300.—IB. Syn. 222.—IB. Birds Am. V, 1842, 203; pl. 316.

FIGURES.—WILSON, Am. Orn. VII, pl. 59, fig. 5.—AUD. B. of Am. pl. 300, Oct. ed. V, pl. 316.—MEYER, Nova Acta, XVI, Supp. pl. 18.

SP. CH.—Bill rather short, legs moderate, wings long, no hind toe, tarsus covered before and behind with small circular or hexagonal scales. Upper parts brownish black, with numerous small circular and irregular spots of golden yellow, most

numerous on the back and rump, and on the upper tail coverts, assuming the form of transverse bands, generally ; also with some spots of ashy white. Entire under parts black, with a brownish or bronzed lustre, under tail coverts mixed or barred with white. Forehead, border of the black of the neck, under tail coverts and tibiae, white ; axillary feathers cinereous ; quills, dark brown ; middle portion of the shafts white, frequently extending slightly to the webs and forming longitudinal stripes on the shorter quills ; tail dark brown, with numerous irregular bands of ashy white, and frequently tinged with golden yellow ; bill, black ; legs, dark bluish brown. *Younger*.—Under parts dull ashy, spotted with brownish on the neck and breast, frequently more or less mixed with black ; many spots of the upper part dull ashy white ; other spots, especially on the rump, golden yellow.

Total length about $9\frac{1}{2}$ inches ; wing, 7 ; tail, $2\frac{1}{2}$ inches.

Hab.—All of North America, South America, Northern Asia, Europe.

Early in October, 1853, I found the golden plover quite abundant in the St Mary's valley, at the western base of the Rocky mountains. They were then found scattered in small flocks upon the plains near the junction of the Bitter Root and Hell-Gate streams, which had recently been burnt over by the spreading fires so commonly started either by accident or design by the wild natives of the far west.

The birds were remarkably unsuspicious and tame, and although frequently shot at were but little alarmed. Those that I killed were very fat, and in excellent condition for the table. I never saw this species near the coast in Washington or Oregon, and presume that, if found there, it is only accidental.

In the collections in San Francisco I saw several birds of this species, which had probably been obtained in the public markets of that city.—S.

ÆGIALITIS VOCIFERUS, (Linn.) Cassin.

Kill-deer.

Charadrius vociferus, LINN, Syst. Nat. I, 1766, 253.—WILS. Am. Orn. VII, 1813, 73 ; fig. pl. lix.—NUT. Man. II, 22.—AUD. Orn. Biog. III, 1835, 191 : V, 577 ; pl. 225.—IB. Syn. 222.—IB. Birds, Am. V. 1842, 207, pl. 317.

Aegialtes vociferus, BON. List, 1838.

Aegialitis vociferus, BAIRD and CASSIN, Gen. Rep. Birds, 692.

FIGURES.—CATESBY'S Carolina, Birds, pl. 71.—BUFF. Pl. Enl. 286.—WILSON'S Am. Orn. VIII, pl. 59, fig. 6.—AUD. B. of Am. pl. 225, oct. ed. V. pl. 317.

SP. CH —Wings long, reaching to the end of the tail, which is also rather long. Head above and upper parts of the body light brown with a greenish tinge, rump and upper tail covers rufous, lighter on the latter. Front and lines over and under the eye, white, another band of black in front above the white band ; stripe from the base of the bill towards the occiput, brownish black ; ring encircling the neck and wide band on the breast, black ; throat white, which color extends upwards around the neck ; other under parts white. Quills brownish black with about half of their inner webs white, shorter primaries with a large spot of white on their outer webs, secondaries widely tipped or edged with white. Tail feathers pale rufous at base ; the four middle light olive brown tipped with white, and with a wide subterminal band of black ; lateral feathers widely tipped with white. Entire upper plumage frequently edged and tipped with rufous. Very young have upper parts light gray, with a longitudinal band on the head and back black ; under parts white. Total length about $9\frac{1}{2}$ inches, wing, $6\frac{1}{2}$; tail, $3\frac{1}{2}$ inches.

Length of a Rocky mountain specimen, 10.75 inches ; extent 20.75 ; bill black ; feet yellow.

Hab.—North and South America.

This plover is a common species in Minnesota, Oregon, and Nebraska Territories, breeding in summer throughout this immense range. In winter they are sparingly found about Puget Sound, as in the east, seemingly preferring the beaches and sand pits near salt water during the cold months. The greater number of individuals, however, retire in the fall to the south ; not returning to the vicinity of the sound until about the end of April. They then repair in

great numbers to the small fresh water ponds in the vicinity of Fort Steilacoom, where they remain during the summer and rear their young. This proverbially noisy, restless bird retains all the peculiar habits on the Pacific that so distinguish it in other localities.—S.

The kill-deer plover is a common summer resident in the interior of the Territory, arriving at Puget Sound early in May, and remaining until October, raising its young during the season. I have never seen this species on the coast.—C.

AEGIALITIS MONTANUS, (Towns.) Cassin.

Rocky Mountain Plover.

Charadrius montanus, Towns, J. A. N. Sc. VII, 1837, 192.—*IB.* Narr. 1839, 349.—*AUD.* Orn. Biog. IV, 1838, 362; pl. 350.—*IB.* Syn. 223.—*IB.* Birds Am. V, 1842, 213; pl. 318.

Aegialites montanus, Bon. List, 1838.

Aegialitis montanus, Baird and Cassin, Gen. Rep. Birds, 693.

SP. CH.—Forehead, stripe over the eye, and entire under parts, white, generally tinged with dull yellowish and ashy on the breast. Another band of black in front above the white band; back of the neck and sides dull brownish fulvous; other upper parts ashy brown, usually with many feathers edged and tipped with fulvous or rufous; upper tail coverts lighter. Quills dark brown, with their shafts white, tail brown with a wide subterminal band of brownish black and tipped with white. Shorter primaries with a white space on their outer webs, forming a patch of white on the wing; under wing coverts and axillary feathers pure silky white. Bill black, legs yellow. Younger, without the black band in front, and with the white band tinged with dull yellow, entire upper parts with the feathers edged and tipped with dull ashy rufous. Total length, about 9 inches; wing, 6; tail, 3 inches.

Hab.—Western North America.

I obtained a specimen of this bird, shot in a "prairie dog town" on Milk river, Nebraska, and have reason to believe that it is found in southern California and New Mexico. Not observed by me in Washington or Oregon. Perhaps it may be found in summer in the interior of southern Oregon towards Utah. The habits of the bird I obtained in Nebraska seem somewhat to resemble those of the golden plover in apparently preferring dry open ground.

I also saw a stuffed specimen in the collection of F. Gruber, San Francisco.—S.

AEGIALITIS SEMIPALMATUS, (Bon.) Cab.

Ring Plover; Semi-palmated Plover.

Charadrius semipalmatus, Bon. Obs. Wils. 1825, No. 219.—*IB.* Syn. 1828, 296.—*IB.* Am. Orn. IV, 1832, 92; pl. xxv.—*NUTTALL*, Mann. II, 24.—*SW.* F. B. Am. II, 1831, 367.—*AUD.* Orn. Biog. IV, 1838, 256; N, 579; pl. 330.—*IB.* Syn. 224.

Aegialitis semipalmatus, Cab. Cab. Journ. 1856, 425.—*BAIRD* and *CASSIN*, Gen. Rep. Birds, 694.

Tringa hiaticula, Wilson, Am. Orn. VII, 1813, 65; pl. lix.

FIGURES.—*WILSON*, Am. Orn. VII, pl. 59, fig. 3.—*AUD.* B. of Am. pl. 330; oct. ed. V. pl. 320.—*BONAP.* Am. Orn. IV, pl. 25, fig. 4.

SP. CH.—Small, wings long, toes connected at base, especially the outer to the middle toe. Front, throat, ring around the neck, and entire upper parts, white, a band of deep black across the breast, extending around the back of the neck below the white ring. Band from the base of the bill, under the eye, and wide frontal band above the white band, black. Upper parts light ashy brown, with a tinge of olive; quills brownish black, with their shafts white in a middle portion, and occasionally a lanceolate white spot along the shafts of the shorter primaries; shorter tertiaries edged with white; lesser coverts tipped with white. Middle feathers of the tail ashy olive brown, with a wide subterminal band of brownish black, and narrowly tipped with white; two outer tail feathers white, others intermediate, like the middle, but widely tipped with white. Bill orange yellow, tipped with black; legs yellow. Female similar, but rather lighter colored. Young without the black band in front, and with the band across the breast ashy brown.

Total length, about 7 inches; extent, $15\frac{1}{2}$; wing, $4\frac{3}{4}$; tail, $2\frac{1}{4}$ inches; iris, brown; bill, orange and black; feet, black.

Hab.—The whole of temperate North America. Common on the Atlantic.

The ring plover passes through along the sea-coast of the Territory when migrating in the

months of April and October. It associates with the small sandpipers along the shores of the bays and estuaries, and though apparently feeding on the same food, it picks it up on the surface of the ground instead of probing in the mud or sand.—C.

SQUATAROLA HELVETICA, (Linn.) Cuv.

Swiss Plover; Black-bellied Plover.

Tringa helvetica, LINN. Syst. Nat. I, 1766, 250.

Squatarola helvetica, CUV. R. A. 1817. BAIRD & CASSIN, Gen. Rep. Birds, 697.

Charadrius helveticus, LICHT. Verz. 1827, No. 728.—AUD. Orn. Biog. IV, 1838, 280; pl. 324.—IB. Syn. 421.—IB. Birds Amer. V. 1842, 199; pl. 315.

Tringa squatarola, LINN. Syst. Nat. I, 1766, 252.

Charadrius apricarius, WILSON, Am. Orn. VII, 1813, 41.

FIGURES.—Buffon, Pl. Enl. 853, 854, 923.—Wilson, Am. Orn. VII, pl. 57, fig. 4.—Aud. B. of Am. pl. 334; oct. ed. V. pl. 315.—Naumann, B. of Germany, pl. 178.—Gould, B. of Eur. IV, pl. 290.

SP. CH.—Bill and legs strong; wings long; a very small rudimentary hind toe. Around the base of the bill to the eyes, neck before and under parts of body, black; upper white, nearly pure and unspotted on the forehead; sides of the neck and rump tinged with ashy, and having irregular transverse bars of brownish black on the back, scapulars and wing coverts; the brownish black frequently predominating on those parts, and the rump also frequently with transverse bars of the same. Lower part of the abdomen, tibia, and under tail coverts, white. Quills brownish black, lighter on their inner webs, with a middle portion of their shafts white, and a narrow longitudinal stripe of white frequently on the shorter primaries and secondaries. Tail white, with transverse imperfect narrow bands of black. Bill and legs black. The black color of the under parts generally with a bronzed or coppery lustre, and presenting a scale-like appearance; the brownish black of the upper parts with a greenish lustre. *Younger and winter plumage*.—Entire upper parts dark brown, with circular and irregular small spots of white, and frequently of yellow, most numerous on the wing coverts; upper tail coverts white. Under parts white, with short longitudinal lines and spots dark brownish cinereous on the neck and breast; quills brownish black, with large longitudinal spots of white on their inner webs, and also on the outer webs of the shorter primaries. *Young*.—Upper parts lighter, and with the white spots more irregular or scarcely assuming a circular shape; narrow lines on the neck and breast more numerous. Length, 11.50 to 12.50; extent, 24.25 to 25.00; wing, 7.25 to 9.75; tail, 3 inches. Iris brown, bill black; feet lead color.

Hab.—All of North America. The seacoasts of nearly all countries of the world.

The black-bellied or Swiss plover I found moderately abundant in Minnesota, and also sparingly on the sand spits and beaches along the Straits of Fuca, in Washington Territory. In the latter vicinity I obtained several specimens in the early part of March, 1856.

Owing to the general mildness of the winters in the last mentioned locality, a few generally remain throughout the season, where, in company with the turnstone and the active little three-toed sandpiper, they may, any fine day during the colder months, be found industriously seeking their favorite food at the edges of the retiring waves. In the spring and fall they are quite common in the San Francisco markets.—S.

The Swiss plover seems to be a resident bird in small numbers, as I shot young birds in July near the mouth of the Columbia river, together with the young of several other species of shore birds. During the coldest winter weather I also observed them in greater numbers, but never in flocks of more than a dozen.—C.

Family HAEMATOPODIDAE.—The Oyster Catchers.

HAEMATOPUS NIGER, Pallas.

Bachman's Oyster Catcher.

Haematopus niger, PALLAS, Zoog. Rosso-Asiat. II, 1811, 131.—BAIRD & CASSIN, Gen. Rep. Birds, 701.

Haematopus bachmani, AUD. Orn. Biog. V. 1839, 245; pl. 427.—IB. Syn. 229.—IB. Birds Amer. V., 1842, 243; pl. 325.—TOWNSEND, NATT. 1839, 348.

SP. CH.—Rather smaller than the preceding; bill rather more slender, wings long; legs robust; tarsi covered with ovate scales; tail short. Head and neck brownish black, with a glaucous or ashy tinge in very adult specimens. All other parts of the plumage, above and below, dark brown, rather darkest on the rump; bill bright red; legs pale reddish, nearly white.

Total length, about 17 inches; wing, $10\frac{1}{2}$; tail, $4\frac{1}{2}$; bill to gape, $3\frac{1}{4}$; tarsus, 2 inches.

Hab.—Western coast of the United States. Kurile islands, (Pallas.)

Bachman's oyster catcher was obtained by Dr. Townsend from the northwest coast, having been presented to him by William Fraser Tolmie, esq., at that time surgeon to the honorable Hudson Bay Company, and at present a chief factor and "resident partner" in that wealthy corporation.

Dr. Tolmie's kindness and interest in furthering the wishes of naturalists both of this country and of Europe have been already mentioned by me in my notes on the *Trichas McGillivrayi*.

Oyster catchers are common in the Rocky islands and points near Victoria, Vancouver's Island, and upon the Rock islands and reefs of the Canal d'Arro and the Straits of Fuca. I have not yet succeeded in obtaining specimens, but have been promised some by friends residing in that vicinity.—S.

I cannot be certain that the above species inhabits the Territory, as the description appears to differ from those observed there by Mr. Gibbs and myself in having *pale red*, instead of blood red legs.

The only locality where I have seen the oyster catcher is the northern shore of Whidby's island, at the Straits of De Fuca. A single one frequented that place in April, feeding among the sea weeds on a rocky shore, which are so nearly like it in color that it can with difficulty be seen at a little distance. This bird was very shy, and I could get no chance to shoot it. On the opposite shores of Vancouver's Island I heard that they were abundant in summer.

When flying over the water from one point to another it makes a wide semi-circle, keeping far from the shore. On starting it utters a loud whistling cry.—C.

STREPSILAS INTERPRES, (Linn.) Ill.

Turnstone.

Tringa interpres, LINN. Syst. Nat. I, 1766, 248.—WILS. Am. Orn. VII, 1813, 32; pl. lvii.

Streptilas interpres, ILLIGER, Prod. 1811, 263.—SW. F. Bor. Am. II, 1831, 371.—NUTT. II, 30.—AUD. Orn. Biog. IV, 1838, 31; pl. 304.—IB. Syn. 227.—IB. Birds Amer. V, 1842, 231; pl. 323.—BAIRD & CASSIN, Gen. Rep. Birds, 701.

FIGURES.—Buff. Pl. Enl. 856.—Vieill. Gal. II, pl. 237.—Wilson, Am. Orn. VII, pl. 57, fig. 1.—Aud. B. of Am. pl. 304; oct. ed. V, pl. 323.

SP. CH.—Upper parts rather irregularly variegated with black, dark rufous, and white. Head and neck above generally white, with numerous spots and stripes of brownish black on the crown and occiput; space in front of the eye white, usually surrounded with black; throat white, on each side of which is a stripe of black running from the base of the bill downwards and joining a large space of the same color (black) on the neck and breast. Abdomen, under wing coverts, under tail

coverts, back and rump, white. Quills brownish black, with their shafts white; tail white at base, with its terminal half brownish black, and tipped with white. Greater wing coverts widely tipped with white, forming a conspicuous oblique bar across the wing; bill black; legs orange. In winter the black of the upper parts is more apparent, and the rufous is of less extent and of lighter shade.

Total length, about 9 inches; extent, 18.75; wing, 6; tail, $2\frac{1}{2}$ inches. Iris brown; bill and feet black.

Hab.—Shores of the Atlantic and Pacific, throughout North America. One of the most widely diffused of birds, being found in nearly all parts of the world.

The turnstone passes through along the coast of the Territory on its northern migration in May, clad in its beautiful summer dress; and in September returns southward in its plain chocolate plumage. Some, perhaps, remain during winter about the shores of Puget Sound.—C.

STREPSILAS MELANOCEPHALUS, Vigors.

Black Turnstone.

Strepsilas melanocephalus, VIGORS, Zool. Jour. IV, Jan. 1829, 356.—*IB.* Zool. Blossom, 1839, 29.—GAMBEL, J. A. N. Sc. 2d series, Aug. 1849, 220.—BAIRD & CASSIN, Gen. Rep. Birds, 702

SP. CH.—About the size of and having the same general form as the preceding, but differing in color. Head, breast, and upper parts of the body fuliginous brown, lighter on the breast, and with every feather having a darker centre; back and wing coverts darker, frequently nearly black and with a greenish lustre; lower part of back, rump, and upper tail coverts white, with a large spot of black on the upper coverts. Abdomen, under tail and under wing coverts white; tips of greater wing coverts white, forming a band across the wing; shorter tertiaries edged externally white. Bill black; feet dark orange. Quills brownish black, with their shafts white; tail at base white, with its terminal half black, narrowly tipped with white.

Total length, about 9 inches; wing, 6; tail, $2\frac{1}{2}$ inches; extent, 18.75.

Hab.—Western North America.

Birds belonging to one or the other of these species are very common in autumn and spring on the sand spits and rocky points of Puget Sound and the Straits of Fuca. They arrive from the north at the same time as the *Lobipes hyperboreus*, about August 20. The bulk of the migration passes to the south before cold weather comes on, although a few remain throughout the winter. I have shot them along the shores of the Straits of Fuca during the months of January, February, and March.

They are very abundant in October, on a small rock island nearly opposite *Seattle*, Puget Sound, where they congregate in immense numbers. I found them usually fat, and comparing favorably with the tattlers and sandpipers as articles of food. They are not a shy bird, and when plentiful are easily obtained, frequently several individuals being killed at one discharge. During the cold months they keep in small companies, feeding busily, like the sandpipers, at the edge of the water, and when disturbed flying to a short distance from the intruder, when again alighting, they eagerly recommence a busy search for their favorite food.—S.

Family RECURVIROSTRIDAE—The Avosets.

RECURVIROSTRA AMERICANA, Gm.

American Avoset.

Recurvirostra americana, Gm. Syst. Nat. I, 1788, 693.—WILS. Am. Orn. VII, 1813, 126.—Sw. F. Bor. Am. II, 1831, 375.—NUTT. Man. II, 78.—AUD. Orn. Biog. IV, 1838, 168; pl. 318.—*IB.* Syn. 252.—*IB.* Birds Amer. VI, 1843, 247; pl. 353.—BAIRD & CASSIN, Gen. Rep. Birds, 703.

Recurvirostra occidentalis, VIGORS, Zool. Jour. IV, 1829, 356.—*IB.* Zool. Blossom, 1839, 28; pl. xii.—WAGLER, Isis, 1831, 520.—BAIRD, Zool. Stansbury, Salt Lake, 1852.—CASSIN, Illust. I, VIII, 1855, 232, pl. xl.

FIGURES.—Wilson, Am. Orn. VII, pl. 63, fig. 2. Aud. B. of Am. pl. 318; oct. ed. vi; pl. 353. Latham, Synopsis, V, pl. 92. Cassin, B. of Cal. and Texas, pl. 40. (Young.)

SP. CH.—Bill rather long, depressed; wings long; legs long; tarsi compressed; tail short. *Adult*: Head and neck pale reddish brown, darker on the head and fading gradually into white. Back, wing coverts, and quills, black; scapulars, tips of greater wing coverts, rump and tail, and entire under parts, white; the last frequently tinged with reddish. Bill brownish black, legs bluish. *Young*: Very similar to the adult, but with the head and neck white, frequently tinged with ashy on the head and neck behind. Total length, 13.12 to 18 inches; wing, $8\frac{1}{2}$ to 9; extent, 28 to 31; tail, $3\frac{1}{2}$; bill to gape, $3\frac{3}{4}$; tarsus, $3\frac{1}{2}$ inches.

Hab.—All of temperate North America; Florida, (Mr. Würdemann.)

During my residence in the northwest I obtained but one specimen of the American avoset, which was afterwards, unfortunately, lost on its way to Washington. This bird appeared to be a straggler, and was shot near Fort Walla-Walla, where it excited a good deal of surprise among some of the older settlers and traders, to all of whom it was new. In western Minnesota, on the contrary, it is very abundant, especially in the saline region along the tributary streams of the Shaysenne river and among the salt lakes and pools of the Grande Coteau. There, where I had a good opportunity of studying their habits, I found that they appeared equally fond of the margins of *running brooks* and the edges of stagnant pools; partly resembling ducks in swimming well upon the surface of the water, and partly the Totani in running along the shore and in wading into the water in search of food. They were very unsophisticated, allowing a near approach, and were but little disturbed by the report of a gun. When alarmed at all, they manifested it much as curlews and willets do, by circling around the intruder, flying backwards and forwards, all the while vociferating loudly. At such times, like the birds mentioned, they can be "tolled" towards the shooter by whistling in imitation of their cry. I have seen a specimen of the avoset in the San Francisco Academy's museum, which had been obtained in California. It is not a common bird in Oregon, the one received being the only specimen I ever heard of in the Territory. In the Salt Lake region they are not uncommon, (*vide* Stansbury's Report,) and this, added to the fact of their great abundance among the salt lakes of western Minnesota, (the present Territory of Dacotah,) seems to indicate a decided preference for such food as is found only in salt and brackish water. My Oregon specimen was much darker than any obtained in Minnesota, a reddish cinnamon tinge being very strongly marked upon the neck. Although I shot many individuals in western Minnesota, I never saw one among them so darkly tinged as the Oregon specimen.

Nuttall says, in a note: "A second species, with a *white* instead of a rufous neck, head, and breast, and very nearly allied, if not identic, with the European or Oriental avoset, was shot near to the Great Northern Bend of the Missouri, and is now, I believe, in the extensive museum of the Right Honorable Lord Stanley, at Knowsley Hall."—Nuttall's Manual, 1st ed. Water Birds, p. 77.

The *Great Bend of the Missouri*, it should be remembered, is very near to the saline region of Dacotah. Probably, however, this bird was simply a specimen of the present species in immature plumage, unless we differ from Mr. Cassin, and admit the existence of *R. occidentalis* as a distinct species.—S.

Common on the Platte river, Nebraska, where I obtained, in August, two specimens, having characters intermediate between *R. americana* and *R. occidentalis*. Never seen by me on the west coast.—C.

Family PHALAROPODIDAE.—The Phalaropes.

PHALAROPUS HYPERBOREUS, (Linn.) Temm.

Northern Phalarope.

Tringa hyperborea, LINN. Syst. Nat. I, 1766, 249.

Lobipes hyperboreus, "Cuv. R. A."—Bon. List, 1838.—Aud. Syn. 1839, 240.—Ib. Birds Amer. V, 1842, 295; pl. 340.

Phalaropus hyperboreus, TEMM. Man. II, 1820, 709.—Aud. Orn. Biog. III, 1835, 118: V, 595; pl. 215.—BAIRD & CASSIN, Gen. Rep. Birds, 706.

FIGURES.—Buff. Pl. Enl. 766.—Edwards, Birds, III, pl. 143, 46, 308.—Aud. B. of Am. pl. 254; oct. ed. V, pl. 340.

SH. CH.—Bill short, straight, pointed; wings long; tail short; legs short. *Adult*: Neck encircled with a ring of bright ferruginous, and a stripe of the same on each side; head above and neck behind sooty ash; back, wings, and tail, brownish black, paler on the rump, mixed with bright ferruginous on the back. Tips of greater wing coverts white. Sides and flanks ashy, frequently mixed with reddish; throat, breast, and abdomen white; bill and legs dark. *Young*: Entire upper parts brownish black; many feathers edged and tipped with dull yellow and ashy; under parts white; tips of greater wing coverts white. Total length, 7 to 8 inches; extent, $13\frac{1}{2}$ to 14; wing, $4\frac{1}{2}$; tail, $2\frac{1}{2}$; bill, 1; tarsus, $\frac{3}{4}$ inch. Female smallest. Iris brown; legs bright slate color; bill black.

Hab.—The whole of temperate North America, Europe, Japan, (Mr. Heine, Japan Exp.) San Francisco, California, (Mr. Cutts.)

The lobefoot passes in spring and fall through the Territory in small flocks, which associate sometimes with the sandpipers, but seem to prefer wetter feeding grounds, wading in the shallow creeks at low tide, and even swimming in the ocean several miles off shore. In August, 1853, I saw a pair either of this or the next species swimming on a small lake on the summit of the Cascade mountains, where they probably had a nest. The young birds appear near the mouth of the Columbia as early as July.—C.

Several specimens of this species I obtained on Puget Sound and Admiralty inlet in August, 1856. About the middle of the latter month individual birds arrive from the north, and towards its close become quite abundant on the sound. They there seem to feed and live principally among beds of kelp and floating patches of dead sea-weed, being rarely seen on the shore. They swim well, and take wing very readily from the water. In the locality just mentioned they are not at all shy, but are readily approached and shot.—S.

PHALAROPUS FULICARIUS, (Linn.) Bon.

Red Phalarope.

Tringa fulicaria, LINN. Syst. Nat. I, 1766, 249.

Phalaropus fulicarius, BON. Obs. Wils. 1825, 232.—Ib. Syn. 1828, 341.—SWAINSON, F. Bor. Amer. II, 1831, 407.—

NUTT. Man. II, 236.—Aud. Orn. Biog. III, 1835, 404; pl. 255.—Ib. Syn. 239.—Ib. Birds Amer. V, 1842, 291; pl. 339.—BAIRD & CASSIN, Gen. Rep. Birds, 707.

FIGURES.—Edwards, Birds, III, pl. 142.—Wilson, Am. Orn. IX, pl. 73, fig. 4.—Aud. B. of Am. pl. 255; oct. ed. V, pl. 339.

SP. CH.—Bill strong, flattened, widened towards the end; wings long; tail short; legs short; plumage thick and compact, like the swimming birds. *Adult*: Head above, space around the base of the bill, throat, and back, brownish black, feathers of the last edged broadly with pale ochre yellow; wings and tail ashy brown, paler on the wing coverts; greater wing coverts widely tipped with white; stripe on the cheek white. Entire under parts deep brownish red, inclining to purple on the abdomen, and with a glaucous cast in very mature specimens; under wing coverts and axillaries pure white; bill greenish yellow; feet dark bluish brown. *Young*: Entire upper parts light cinereous; head above and wings darker, and mixed with blackish brown; head in front, and entire under parts, white; tips of greater wing coverts white. Total length, from $7\frac{1}{2}$ to $8\frac{3}{4}$ inches; extent, 16; wing, $5\frac{1}{2}$; tail, $2\frac{3}{4}$; bill, 1; tarsus, $\frac{3}{4}$ inch. Iris dark brown; bill and feet black.

Hab.—Entire temperate regions of North America; Asia; Europe.

I never observed but *two* red phalaropes in Washington Territory, and those late in November appeared during a storm in Shoalwater bay, where they swam in the surf near shore picking at small crustacea washed out of the sand. They seemed much more aquatic in their habits than the preceding, and I am inclined to think that the birds seen in large flocks off the coasts of California and Mexico in winter are of this species.—C.

Family SCOLOPACIDAE.—The Snipes.

Sub-Family SCOLOPACINAE.—Short-legged Snipe.

GALLINAGO WILSONII, (Temm.) Bon.

Wilson's Snipe; English Snipe.

Scolopax wilsonii, TEMM. Pl. Col. V, livraison LXVIII, about 1824. In text of *Scolopax gigantea*.—BON. Syn. 1828, 330.—SWAINS. F. B. Am. II, 1831, 401.—NUTT. Man. II, 185.—AUD. Orn. Biog. III, 1835, 322 : V, 1839, 583 ; pl. 243.—IB. Syn. 248.—IB. Birds Amer. V, 1842, 339 ; pl. 350.

Gallinago wilsonii, BONAP. List, 1838.—BAIRD & CASSIN, Gen. Rep. Birds, 710.

Scolopax gallinago, WILS. Am. Orn. VI, 1812, 18. Not of Linnaeus.

Scolopax delicata, ORD, ed. Wils. IX, 1825, 218.

? *Scolopax drummondii*, SW. F. Bor. Am. II, 1831, 400.—AUD. Orn. Biog. V, 1839, 319.—IB. Syn. 249.—IB. Birds Amer. V.

? *Scolopax douglassii*, SW. F. Bor. Am. II, 1831, 400.

? *Scolopax leucurus*, SW. F. Bor. Am. II, 1831, 50.

SP. CH.—Bill long, compressed, flattened and slightly expanded towards the tip, pustulated in its terminal half; wings rather long; legs moderate; tail short. Entire upper parts brownish black; every feather spotted and widely edged with light rufous, yellowish brown or ashy white; back and rump transversely barred and spotted with the same; a line from the base of the bill over the top of the head. Throat and neck before, dull reddish ashy; wing feather marked with dull brownish black; other under parts white, with transverse bars of brownish black on the sides, axillary feathers and under wing coverts and under tail coverts; quills brownish black; outer edge of first primary white; tail glossy brownish black, widely tipped with bright rufous, paler at the tip, and with a subterminal narrow band of black; outer feathers of tail paler, frequently nearly white and barred with black throughout their length. Bill brown, yellowish at base and darker towards the end; legs dark brown.

Male: length, 10 to 10.50; extent, 16. Female: length, 11; extent, 17 inches; wing, 5; tail, $2\frac{1}{4}$; bill, $2\frac{1}{2}$; tarsus, $1\frac{1}{2}$ inch. Feet pale greenish gray.

Hab.—Entire temperate regions of North America. California, (Mr. Szabo.)

Wilson's snipe is generally distributed throughout all such portions of Oregon and Washington where nature has provided them with suitable abiding places. Many remain in the vicinity of Puget Sound throughout the winter, unless it be unusually cold. This is not surprising when we consider the mild open character of the winter of the coast region of those Territories, which, unlike the hard, cold season of places on the Atlantic coast of the same northern latitude, is what might be properly termed a *rainy season*.

Further in the interior they are found, and a few winter near Fort Dalles, on the Columbia. In that vicinity I found several individuals on a cold day in the winter of 1854-'55 who had retreated from their ordinary haunts—owing to the frozen condition of the surface of the ground and a slight fall of snow—and were then busy close to the edge of an open running brook, running along the line where the snow had been melted by the ripples of the water, and feeding and acting at the time much like sandpipers—having been thus driven by sheer necessity to an almost complete abandonment of their ordinary habits. It is probable that had the change in the weather been less sudden, these birds would have migrated further south;

but as it was they were taken unawares, and reduced to great straits by cold and starvation. In habits, voice, and general appearance, this species on the west coast retains all the individual characteristics noted in eastern birds. This fact, together with the total absence of any skins in the Smithsonian collection, indicating the existence of another species of this genus in our northwest, leads me to judge, with Mr. Cassin, that there is but little probability that either the so-called *S. Drummondii*, or the *S. Douglassii*, exist in nature. A few remain and breed during the summer in the neighborhood of Puget Sound, but the greater portion retire to the north for that purpose. Near Fort Steilacoom they are abundant in spring and fall on the marshes around the small lakes in that vicinity, and also in the thicket-covered swamps near the mouths of the Nisqually, Puyallup, and other rivers.—S.

The American snipe is not uncommon in the Territory during the migrating season, and I think a few remain throughout mild winters, but most of this species seem to go on at once to the plains of California, where I saw them in immense numbers in November. In habits, flight, and the peculiar quacking cry when startled, they precisely resemble the same bird near the Atlantic. I saw them near the Columbia in August.—C.

MACRORHAMPHUS GRISEUS, (Gmelin,) Leach.

Gray Snipe; Red-breasted Snipe.

Scolopax grisea, Gmelin, Syst. Nat. I, 1788, 658, No. 27.

Macrorhamphus griseus, "Leach, Catal. Brit. Mus. 1816, 31."—Stephens, Shaw. Gen. Zool. XII, 1824, 61.—Bon. Am. Orn. IV, 1832, 51; pl. xxiii.—Baird & Cassin, Gen. Rep. Birds, 712.

Scolopax noveboracensis, Gm. Syst. Nat. I, 1788, 658, No. 28.—Wilson, Am. Orn. VII, 1813, 45; pl. lviii.—Sw. F. Bor. Am. II, 1831, 398.—Aud. Orn. Biog. IV, 1838, 288; pl. 339.—Ib. Syn. 249.—Ib. Birds Amer. VI, 1843, 10; pl. 351.

SP. CH.—Rather smaller than the preceding; bill long, compressed, flattened and expanded towards the end, and in the same space punctulated and corrugated; wing rather long; shaft of first primary strong; tail short; legs rather long. *Adult*: Upper parts variegated with dark ashy, pale reddish and black, the latter predominating on the back; rump and upper tail coverts white, the latter spotted and barred transversely with black. Under parts pale ferruginous red, with numerous points and circular spots of brownish black on the neck before, and transverse bands of the same on the sides and under tail coverts; axillary feathers and under wing coverts white, spotted and transversely barred with black. Quills brownish black; shaft of first primary white; tail brownish black, with numerous transverse bands of ashy white, and frequently tinged with ferruginous, especially on the two middle feathers; bill greenish black; legs dark greenish brown. *Younger*: Entire under parts dull white, strongly marked with dull ashy on the neck in front, and transverse bands of the same on the sides; axillary feathers and under wing coverts white, spotted with brownish black; upper parts lighter than in the adult. Total length about 10 inches; wing, $5\frac{3}{4}$; tail, $2\frac{1}{4}$; bill, $2\frac{1}{4}$; tarsus, $1\frac{1}{4}$ inch.

Hab.—Entire temperate regions of North America.

Quite common in autumn near Fort Steilacoom. A few also remain throughout the summer and breed. A female specimen (371) killed May 5, 1856, near Fort Steilacoom, from the appearance of her plumage appeared to be then incubating. It measured $11\frac{3}{4}$ —19, bill $3\frac{1}{16}$. In that vicinity the young "of the year" begin to appear on the edges of brackish pools and in other places abounding in their favorite food in August, and during the following two months birds of the species, of all ages, are very abundant.—S.

The red-breasted or robin snipe is not very abundant, and associates in flocks, with several species of small sandpipers, during spring and fall, along the edges of salt marshes and flats near the coast.—C.

TRINGA ALPINA, Linn., var. AMERICANA, Cass.

Red-backed Sandpiper.

Tringa alpina, LINN. Syst. Nat. I, 1766, 249.—WILSON, Am. Orn. VII, 1813, 25; pl. lvi.—Sw. F. B. Am. II, 1831, 383.—NUTT. Man. II, 106.—AUD. Orn. Biog. III, 1835, 580; pl. 290.—IB. Syn. 234.—IB. Birds Amer. V, 1842, 266; pl. 332, var. *Americana*, BAIRD & CASSIN, Gen. Rep. Birds, 719.

Tringa cinclus, LINN. Syst. Nat. I, 1766, 251.—WILSON, Am. Orn. VII, 1813, 39; pl. lvii.

FIGURES.—WILSON, Am. Orn. VII, pl. 7, fig. 3; pl. 56, fig. 2.—AUD. B. of Am. pl. 290; oct. ed. V, pl. 332.

SP. CH.—Bill longer than the head, wide at base, curved, slightly widened and flattened towards the end; nasal groove and another groove in the under mandible long and very distinct; wings long; tail short, with the two middle feathers longest and pointed; legs rather long and slender, lower half of the tibia naked; toes moderate, free at base, flattened underneath and slightly marginated; claws much compressed, hind toe small. Upper parts yellowish red, mixed with ashy, and every feather having a lanceolate, ovate or narrow spot in the centre, most numerous on the back and rump. Front, sides of the head, and entire under parts, ashy white, nearly pure white on the abdomen and under tail coverts; a wide transverse band of black across the lower part of the breast; neck before and upper part of the breast with narrow longitudinal spots of brownish black. Under wing coverts and axillary feathers white; quills light ashy brown, darker on their outer edges, with their shafts white; tail feathers light ashy brown; middle feathers darker, outer nearly white. Bill and legs very dark brownish black. Sexes alike.

Winter plumage.—Entire upper parts dark ashy, nearly black on the rump and upper tail coverts; throat, abdomen, axillaries, and under wing coverts, white; breast pale ashy, with longitudinal lines of dark brown.

Total length, $8\frac{1}{2}$ to 9 inches; extent, $15\frac{1}{2}$ to 16; wing, 5; tail, $2\frac{1}{2}$; bill from gape, $1\frac{1}{2}$; tarsus, 1 inch.

Hab.—Entire temperate regions of North America.

This bird is very abundant on the salt marshes at the mouths of the rivers emptying into Puget Sound, where the species is resident throughout the year. In habits they do not differ from those recorded in Nuttall's Manual. Early in the season, before they have been rendered wild by being much shot at, I have observed that upon a volley being fired into a flock the unharmed birds in terror sweep around in several circles, and hovering "buirch," as the sportsmen say, over their wounded companions, and sometimes realight with them. At the moment of their hovering in a compact body over the wounded is the time generally seized to fire the reserved barrels, two or three shots will frequently bring down from thirty to sixty birds; and I have known one instance where an officer of the army bagged ninety-six birds from one discharge of his fowling piece. After being fired into once or twice the flocks, learning to avoid sympathizing with their dead and wounded, become shy and wary. At Puget Sound this species is very fond of alighting in flocks upon the half submerged drift logs which lie stranded on the flats off the entrances of the Nisqually and other rivers, especially at high water, when the surrounding marshes and flats are generally covered. Upon these logs the birds will sometimes for hours sit compactly huddled together and motionless—perhaps for the purpose of aiding the digestion of their food—perhaps simply because the high tide having covered their feeding grounds they have learned by experience that the most philosophical plan is "to take it easy" and await the subsidence of the waters.—S.

The red-backed alpine snipe, or ox-bird, is common in the same season and places as the preceding species.—C.

TRINGA MACULATA, Vieill.

Jack Snipe.

Tringa maculata, VIEILLOT, Nouv. Dict. XXXIV, 1819, 465.—BAIRD & CASSIN, Gen. Rep. Birds, 720.

Tringa pectoralis, SAY, Long's Exped. I, 1823, 171.—BON. Am. Orn. IV, 1832, 43; pl. xxiii.—NUTT. Man. II, III.—AUD. Orn. Biog. III, 1835, 601; V, 582; pl. 294.—IB. Syn. 233.—IB. Birds Amer. V, 1842, 259; pl. 329.

FIGURES.—Bonap. Am. Orn. IV, pl. 23, fig. 2.—Aud. B. of Am. pl. 294; oct. ed. V, pl. 329.

SP. CH.—Bill rather longer than the head, compressed, slightly depressed and expanded at the tip; nasal groove long; wings long; legs rather long; tibia with nearly its lower half naked; toes free at base, flattened underneath and slightly margined; tail rather short; middle feathers pointed. Entire upper parts brownish black; all the feathers edged and tipped with ashy and brownish red; rump and upper tail coverts black, some of the outer feathers of the latter edged with white. Line from the bill over the eye ashy white; throat, abdomen, under wing coverts, axillary feathers, and under tail coverts, white. Breast and neck before ashy white; all the feathers darker at base, and with partially concealed lanceolate or pointed spots of brownish black. Quills brownish black; shaft of first primary white, of others brown; secondaries tipped and edged with white; tertiaries edged with dull reddish yellow. Bill and feet dark greenish black. Total length, about 9 inches; wing, $5\frac{1}{4}$; tail, $2\frac{1}{2}$; bill to gape, $1\frac{1}{2}$; tarsus, 1 inch.

Hab.—The entire coast of North America; South America; Europe.

This snipe is found moderately abundant at Puget Sound, but it is rare to find them there, except singly. A male specimen, marked 373, killed at Fort Steilacoom, measured, in length, 9.75 inches; extent, 18.25. The species appears to be only a visitor in the spring and fall, though a few, perhaps, remain through the summer.—S.

TRINGA WILSONII, Nuttall.

Least Sandpiper.

Tringa pusilla, WILSON, Am. Orn. V, 1812, 32; pl. 37. Not of Linnaeus.—Aud. Orn. Biog. IV, 1838, 180; pl. 320.—

IB. Syn. 237.—IB. Birds, Am. V, 1842, 280; pl. 337.

Tringa wilsonii, NUTTALL, Man. II, 1834, 121.—BAIRD & CASSIN, Gen. Rep. Birds, p. 271.

FIGURES.—Wilson, Am. Orn. V, pl. 37, fig. 4.—Audubon's B. of Am. pl. 320; oct. ed. V, pl. 337.

SP. CH.—The smallest of all known species of this group found in North America. Bill about as long as the head, slightly curved towards the end, which is very slightly expanded; grooves in both mandibles to near the tip; wing long; tertiaries nearly as long as the primaries; tail short; middle feathers longest; outer feathers frequently longer than the intermediate; legs long; lower third of the tibia naked; toes long, slender, margined and flattened beneath; hind toe small. Upper parts with nearly every feather having a large central spot of brownish black, and widely margined with ashy and bright brownish red; rump and middle of the upper tail coverts black; outer coverts white, spotted with black. Stripe over the eye, throat, and breast pale ashy white, with numerous small longitudinal spots of ashy brown; abdomen and under tail coverts white. Quills dark brown, with the shafts of the primaries white; tertiaries edged with reddish. Middle feathers of the tail brownish black; outer feathers light ashy white. Under surface of wing light brownish ashy, with a large spot of white near the shoulder; axillary feathers white; bill and legs greenish brown, the latter frequently yellowish green. Total length from tip of bill to end of tail about $5\frac{1}{2}$ to 6 inches; extent, 11.50; wing, $3\frac{1}{2}$ to $3\frac{3}{4}$; tail, $1\frac{3}{4}$; bill to gape, $\frac{3}{4}$; tarsus, $\frac{3}{4}$ inch. Bill black; feet brown.

Hab.—Entire temperate North America.

Wilson's sandpiper is quite abundant during the spring and autumn in the vicinity of Fort Steilacoom, Puget Sound. They prefer the muddy edges of pools of brackish or fresh water, and are occasionally found along the borders of meadow brooks, especially in the spring. In 1856 they arrived at Fort Steilacoom during the first week in May, and were then seen either in small flocks or in pairs. Two males, shot at that time, measured respectively in length and extent 5.87, 11.38; — and 6.11 inches. In the fall they are found in rather large flocks, and are then readily killed on the lagoons and mud flats at different localities along the sound; a few remain throughout the summer.—S.

Wilson's sandpiper I have only observed in summer, when they breed about the shores of the bays near the Columbia river, as I supposed, from seeing young in July, though I have not seen the nest. I have also found the species common along the Platte river, Nebraska, in summer, and have no doubt of their breeding there.—C.

CALIDRIS ARENARIA, (Linn.) Illiger.

Sanderling.

Tringa arenaria, LINN. Syst. Nat. I, 1766, 251.—AUD. Orn. Biog.—IB. Birds Amer, V, 1842, 287; pl. 338.

Calidris arenaria, ILLIGER, Prod. 1811, 249.—SW. F. B. Am. II, 366.—NUTT. Man. II, 1834, 4.—BAIRD & CASSIN, Gen. Rep. Birds, p. 23.

Charadrius calidris, LINN. Syst. Nat. I, 1766, 255.—WILSON. Am. Orn. VII, 1813, 68; pl. lix.

Charadrius rubidus, GM. I, 1788, 688.—WILSON, Am. Orn. VII, 1813, 129; pl. lxiii.

FIGURES.—WILSON, Am. Orn. VII, pl. 59, fig. 4, pl. 63, fig. 3.—AUD. B. of Am. pl. 230; oct. ed. V, pl. 338.

SP. CH.—No hind toe; front toes moderate or rather long, flattened underneath; distinctly margined with a membrane. Bill rather longer than the head, straight, rather thick; ridge of upper mandible flattened; nasal groove deep and nearly as long as the upper mandible, not so distinct in the lower; both mandibles widened and flattened at the tip; aperture of the nostril large and covered with a membrane. Wing long; tail short, with the middle feathers longest; under coverts long as the tail; legs moderate; lower third of the tibia naked. Under parts light ashy, with lanceolate, hastate, and ovate spots of brownish black on the top of the head, on the back, scapulars, and shorter quills; rump and upper tail coverts with fine transverse lines of black. Under parts pure white. Shoulders brownish black, without spots; quills brownish black with their shafts white and much paler on their inner webs; greater wing coverts widely tipped with white; middle feathers of the tail ashy brown, edged with white; outer feathers paler; bill and legs greenish black. Sexes alike.

In spring plumage the head, neck, and breast are tinged with pale yellowish red and spotted with dark brown; back and scapulars edged and tipped with yellowish red; rump and upper tail coverts ashy brown; under parts of the body pure white.

Total length, $7\frac{3}{4}$ to 8 inches; extent, 15.50; wing, 5; tail, 2; bill about 1 inch; tarsus about 1 inch. Bill and feet black.

Hab.—Entire temperate regions of North America, South America, Europe.

The Sanderling plover is quite abundant on the shores of the lower part of Puget Sound, and also along the beaches of Admiralty Inlet and the Straits of Fuca. They are most abundant during the autumn and early winter, although a few remain throughout the year at all seasons. They principally affect sand-spits and surf-beaches, and have much the habits of the *Tringæ* and *Totani*. In autumn they are fat and easily shot. When in good order this bird is delicious for the table—in my opinion being second to none of its relatives.—S.

The three-toed sandpiper is abundant on the sea-shore during winter, forming great flocks, together with other small species, especially the red-back and other sandpipers. A few of them are found near the mouth of the Columbia in July, so that they may possibly breed in the Territory.—C.

Sub-Family TOTANINAE, Long-legged Snipe.

SYMPHEMIA SEMIPALMATA, (Gm.) Hartlaub.

Willet.

Scolopax semipalmatus, GMELIN, Syst. Nat. I, 1788, 659.—WILSON. Am. Orn. VII, 1813, 27; pl. lvi.

Totanus semipalmatus, TEMM. Man.—BON. Obs. 1825; No. 206.—SW. F. Bor. Am. II, 1831, 388; pl. lxvii.—AUD. Orn. Biog. III, 1835, 510; V, 585; pl. 274.—IB. Birds Amer. V, 1842, 324; pl. 347.

Totanus (Catoptrophorus) semipalmatus, BON. Syn. 1828, 328.—NUTT. Man. II, 1834, 144.

Symphemia semipalmata, HARTLAUB, Rev. Zool. 1845, 342.—BAIRD & CASSIN, Gen. Rep. Birds, 729.

FIGURES.—WILSON Am. Orn. VII, pl. 56, fig. 3.—AUD. B. of Am. pl. 274; oct. ed. V, pl. 347.—RICH. and SWAINS. Faun. Bor. Am. Birds, pl. 67.

SP. CH.—The largest American species of this genus. Bill longer than the head, straight, rather thick and strong; groove in the upper mandible extending about half its length, in the lower mandible nearly obsolete; wings long; legs long, strong; toes moderate, united at base by membranes, the larger of which unites the outer and middle toe; hind toe small; tail short. Adult.—Entire upper parts dark ash color, (without spots;) the shafts of the feathers brownish black; rump and upper tail coverts white. Under parts white, tinged with ashy on the neck and sides; axillaries and under wing coverts

brownish black; primary quills white at base, and tipped with brownish black; secondaries white, spotted with brownish black; tail ashy white, the two middle feathers strongly tinged with ashy; others spotted with dark ashy brown. Bill dark bluish brown, lighter at base; legs light blue. *Younger*.—Entire plumage spotted, and transversely banded with brownish black.

Total length about 15 inches; wing, $8\frac{1}{4}$; tail, $3\frac{1}{4}$; bill about $2\frac{1}{2}$; tarsus about $2\frac{1}{2}$ inches.

Hab.—Entire temperate regions of North America; South America.

I obtained a specimen of the Willet at San Francisco, Cal., where they are quite common in the markets during the autumn, winter, and spring. From their abundance in California I have no doubt that Dr. Townsend is correct in assigning this bird a place in the Oregon fauna. Unfortunately, I myself have never obtained a specimen north of San Francisco.—S.

Probably rare on the coast of Washington Territory, though sportsmen have told me they had shot it. I never obtained a specimen.—C.

GAMBETTA MELANOLEUCA, (Gm.) Bon.

Tell Tale Tattler; Stone Snipe; Greater Yellow-Legs.

Scolopax melanoleucus, Gmelin, Syst. Nat. I, 1788, 659.

Gambetta melanoleuca, Bon. Comptes Rendus, Sept. 1856.—BAIRD & CASSIN, Gen. Rep. Birds, 731.

Scolopax vociferus, Wilson, Am. Orn. VII, 1813, 57; pl. lviii.

Totanus vociferus, Aud. Syn. 244.—IB. Birds Amer. V, 1842, 316; pl. 345.

SP. CH.—Bill longer than the head, rather slender, curved towards the tip; wings rather long, first quill longest; tail short; neck and legs long; toes moderate, margined and flattened underneath, connected at base by membranes, the larger of which unites the outer and middle toe; hind toe small; claws short, blunt; grooves in both mandibles extending about half their length. Entire upper parts cinereous of various shades, dark in many specimens in full plumage, generally light with white lines on the head and neck and with spots and edgings of dull white on the other upper parts; lower back brownish black; rump and upper tail coverts white, generally with more or less imperfect transverse narrow bands of brownish black; under parts white, with longitudinal narrow stripes on the neck and transverse crescent lanceolate and sagittate spots and stripes on the breast and sides; abdomen pure white; quills brownish black with a purplish lustre, shaft of first primary white, secondaries and tertiaries tipped and with transverse bars and spots of ashy white; tail white, with transverse narrow bands of brownish black, wider and darker on the two middle feathers; bill brownish black, lighter at the base; legs yellow; iris brown; bill grayish black.

Total length about 14 inches; extent, $23\frac{1}{2}$; wing, $7\frac{1}{2}$ to 8; tail, $3\frac{1}{4}$ to $3\frac{1}{2}$; bill, $2\frac{1}{4}$; tarsus, $2\frac{1}{2}$ inches.

Hab.—Entire temperate regions of North America; Mexico.

The *great yellow-leg tattler* I found pretty generally distributed throughout the country—obtaining specimens in the remote interior on the Bitter Root stream of the Rocky mountains, and also on Puget Sound in the vicinity of the seacoast. This bird, in the last-named locality, is quite abundant during the spring and autumn, where it is found both on fresh water margins and also on the salt marshes and tide prairies at the mouths of the various rivers emptying into the sound. It is there in common with the gray snipe, (*M. griseus*,) known to the Nisqually Indians by the name of *Ky-yo-e-yah*, a word intended to represent the cry of this bird as it strikes the Indian ear. The habit of these aborigines of naming birds and beasts after their cries is quite common on the northwest coast.—S.

The yellow-leg snipe is common near the coast in summer, and I think some remain during the winter.—C.

RHYACOPHILUS SOLITARIUS, (Wils.) Cassin.

Solitary Sandpiper,

Tringa solitaria, Wilson, Am. Orn. VII, 1813, 53; pl. lviii.

Totanus solitarius, Aud. Syn. 1939, 242.—IB. Birds Am. V, 1842, 309; pl. 343

Totanus chloropygius, VIEILLOT, Nouv. Dict. VI, 1816, 401.—Bon. Obs. 1825, No. 210.—Sw. F. B. Am. II, 1831, 393.—

NUTTALL, II, 159.—Aud. Orn, Biog. III, 1835, 576: V, 583; pl. 289.

Totanus glareola, ORD, ed. Wils. VII, 1825, 57.

Rhyacophilus solitarius, BAIRD & CASSIN, Gen. Rep. Birds, 733.

SP. CH.—Bill rather longer than the head, straight, slender, compressed; both mandibles with narrow grooves; wing long, pointed; tail medium or rather short, rounded; legs rather long, slender; lower half of the tibia naked; toes long, the outer united to the middle by a small membrane, flattened underneath, margined. Upper parts greenish brown, with numerous small circular and irregular spots of ashy white; upper tail coverts darker. Under parts white; breast and neck before with numerous longitudinal lines of greenish brown; sides, axillaries, and under wing coverts white, with numerous transverse narrow bands of dark greenish brown; under tail coverts white, with a few transverse bands of dark brown. Quills brownish black, with a slight bronzed or reddish lustre on the primaries; two middle feathers of the tail greenish brown; other feathers of the tail pure white, with about five transverse bands of brownish black. Bill and legs dark greenish brown.

Total length, about 8 to 9 inches; extent 16.62 to 17; wing, 5; tail, $2\frac{1}{4}$; bill, $1\frac{1}{4}$; tarsus, $1\frac{1}{4}$ inches.

Hab.—Entire temperate regions of North America; Mexico.

The solitary sandpiper is not rare about Puget Sound. While at Fort Steilacoom I obtained several specimens. Two of these, shot in May, 1856, rather exceeded the measurement given in the general report, being in length 9 inches each; extent 16.62 and 17; wing 3.50. They are a quiet solitary bird generally, and possesses no remarkable habits as far as I have noticed.—S.

Apparently less common on the west than the east side of the continent.—C

HETEROSCELUS BREVIPES, (Vieill.) Baird.

Wandering Tattler.

Totanus brevipes, VIEILL. Nouv. Dict. VI, 1816, 410.—CASSIN, Pr. N. A. Sc. VIII, 1856, 40.

Totanus oceanicus, LESSON, Comp. Buff. 1847, 244.

Totanus fuliginosus, GOULD, Voy. Beagle, Birds. 1841, 130.

Heteroscelus brevipes, BAIRD & CASSIN, Gen. Rep. Birds, 734.

FIGURES.—GRAY, Genera, III, pl. 154?

SP. CH.—Rather larger than *T. flavipes*. Bill rather longer than the head; wings long; legs shorter than usual in this group, toes moderate. Entire upper parts dark lead colored, uniform, and without white marks; under parts white, with more or less of dark cinereous or plumbeous on the sides and neck; under wing coverts white, spotted and barred with dark plumbeous. Quills dark brown; shaft of the first primary white on its upper surface; shafts of other primaries reddish brown on the upper surface, and white on their under surfaces. Tail dark lead colored, uniform with upper parts of body. Bill dark; feet greenish. Younger.—Under parts white, transversely barred with dark ashy brown, especially on the sides and flanks. Throat and middle of abdomen white.

Total length, male, $10\frac{1}{2}$ to $11\frac{1}{2}$; extent, $20\frac{1}{2}$ to $21\frac{1}{2}$ inches. Female, $11\frac{1}{2}$ to $11\frac{3}{4}$; extent, $21\frac{1}{4}$ inches; wing, $6\frac{1}{2}$; tail, $3\frac{1}{4}$; bill, $1\frac{1}{2}$; tarsus, $1\frac{1}{4}$ inches.—Iris, brown; bill, dark olive; legs, dull yellow.

Hab.—Washington Territory; islands in the Pacific; South America; northeastern Asia; Japan.

This species seems to be rather rare on the western coast of America, though a few probably breed north of the Straits of De Fuca. On the first of May, 1854, I shot a pair, the first I had seen, at Shoalwater bay, and during the month saw two other pairs. Each pair were mates, and did not associate with any other shore birds. They frequented a rocky point, feeding among the stones and seaweeds, and sometimes hiding behind them. When started, they make a loud piping cry, and flew much like the other species. In September, 1855, I obtained a young bird near the same place, which was somewhat different from the adult in spring plumage.—C.

TRINGOIDES MACULARIUS, (Linn.) Gray.

Spotted Sandpiper.

Tringa macularia, LINN. Syst. Nat. I, 1766, 249.—WILS. Am. Orn. VII, 1813, 60; pl. lix.

Totanus macularius, TEMMINCK, Man. II, 1820, 656.—BON. Obs. Wils. 1825, No. 211.—NUTT. Man. II, 1834, 162.—

AUD. Orn. Biog. IV, 1838, 81; pl. 310.—IB. Syn. 242.—IB. Bird's Amer. V, 1842, 303; pl. 342.

Actites macularius, BON. List, 1838.

Tringoides macularius, GRAY, genera. BAIRD and CASSIN, Gen. Rep. Birds, 735.

FIGURES.—WILSON, Am. Orn. VII, pl. 59, fig. I.—AUD. B. of Am. pl. 310, oct. ed. V, pl. 342.

SP. CH.—Small; bill rather longer than the head, straight, slender; long grooves in both mandibles; wing rather long, pointed; tail medium, rounded; legs rather long; lower third of the tibia naked; toes long, margined, and flattened underneath; outer connected with the middle toe by a large membrane; inner very slightly connected to the middle toe. Upper parts brownish olive green, with a somewhat metallic or bronzed lustre, and with numerous longitudinal lines, and sagittate lanceolate, and irregular spots of brownish black, having the same lustre. Line over the eye and entire under parts white, with numerous circular and oval spots of brownish black, smaller on the throat, largest on the abdomen. Quills brown, with a green lustre; primaries slightly tipped with white, and having a white spot on their inner edges; secondaries white at their bases, and tipped with white; middle feathers of the tail same green as other upper parts, outer tipped with white, and with irregular bars of brownish black. Bill yellowish green, tipped with brown; feet reddish yellow. When fresh, the bill is black, yellow at base, and feet flesh color, according to Cassin.

Young less bronzed above, and under parts white, without spots.

Total length, $7\frac{1}{2}$ to 8 inches; extent, $12\frac{3}{4}$; wing, $4\frac{1}{2}$; tail, 2; bill, 1; tarsus, rather less than 1 inch.

Hab.—Entire temperate North America; Oregon. Europe.

Two specimens which I obtained of the "tip-up," or peet-weet snipe of the northwest, both seemed to differ slightly from the description of the *Tringoides macularius* in the text of Audubon's Synopsis, but in *habits, voice, size, and general appearance* the Pacific and Atlantic birds appear identical. The species is not abundant in Oregon and less so in Washington Territory.

At Panama, in January, 1856, I saw "peet-weets" quite common on the shores of the bay and islands in the vicinity. I suppose that the birds I there saw were identical with the Oregon species.—S.

The spotted sandpiper is common during summer in the interior, frequenting the margins of brooks and rarely appearing along the coast. It raises its young in the Territory and retires south in October.—C.

TRYNGITES RUFESCENS, (Vieill.) Cab.

Buff-breasted Sandpiper.

Tringa rufescens, VIEILLOT, Nouv. Dict. XXXIX, 470. (Louisiana.)—IB. Galerie Ois. II, 1825, 105; pl. 238.—

NUTT. Man. II, 1834, 113.—AUD. Orn. Biog. III, 1835, 451; pl. 265.—IB. Syn. 235.—IB. Bird's

Amer. V, 1842, 264; pl. 331.

? *Actidurus naevius*, HEERMANN, Pr. Acad. N. S. Phil. VII, 1854, 179. (Texas.)

Tryngites rufescens, CAB. BAIRD & CASSIN, Gen. Rep. Birds, 739.

FIGURES.—Trans. Linn. Soc. London, XVI, pl. 2.—GOULD, B. of Eur. IV, pl. 326.—AUD. B. of Am. pl. 265; oct. ed. V, pl. 331.—VIEILL. Gal. II, pl. 238.

SP. CH.—Bill about the length of the head, straight, compressed, narrow at the point; nasal groove long; wings very long; first quill longest; tertiaries rather shorter; tail moderate or longer than usual in this group; legs rather long; lower third of the tibia naked; toes free at base, flattened underneath, and slightly margined; hind toe small. Upper parts pale and dull ashy brown, with a yellowish tinge; every feather with a large central, lanceolate, crescent-shaped, or oblong spot of black, frequently with a glossy green tinge, especially on the back and shorter tertiaries. Under parts light yellowish red, or pale fawn color; many feathers tipped with white, and paler on the flanks and abdomen, on the breast

with partially concealed small spots of black; axillary feathers white. Quills with their outer webs light brown, inner webs ashy white marbled with black and narrowly tipped with white; middle tail feathers brownish black; outer feathers lighter, with transverse waved lines of black, and tipped with white; bill greenish black; legs greenish yellow. Total length $7\frac{1}{2}$ to 8 inches; wing, $5\frac{1}{2}$; tail, 3; bill, from gape, 1; tarsus, $1\frac{1}{4}$ inches.

Hab.—All of North America, South America, Europe.

Common at Shoalwater bay during the migrating season, in company with the other little sandpipers, and apparently seeking the same resorts and subsistence.—C.

LIMOSA FEDOA, (Linn.) Ord.

Marbled Godwit.

Scolopax fedoa, LINN. Syst. Nat. 10th ed. I, 1758, 146: 12th ed. I, 1766, 244.—WILS. Am. Orn. VII, 1813, 30; pl. lvi.

Limosa fedoa, ORD. ed. Wils. VII, 1825.—IB. List, 1838.—SW. F. B. A. II, 1831, 395.—NUTT. Man. II, 1834, 173.—

AUD. Orn. Biog. III, 1835, 287; V. 590; pl. 238.—IB. Syn. 246.—IB. Birds Am. V, 1842, 331; pl.

348.—BAIRD & CASSIN, Gen. Rep. Birds, 740.

Scolopax marmorata, LATH. Ind. II, 1790, 720.

FIGURES.—WILSON, Am. Orn. VII, pl. 56, fig. 1.—AUD. B. of Am. pl. 238; oct. ed. V, pl. 348.—EDWARDS' Birds, III, pl. 137.—VIEILL. Gal. des Ois. II, pl. 243.

SP. CH.—Bill long, curved upwards; both mandibles grooved; wings long; tail short; legs long; tibia with its lower half naked; toes rather short, margined and flattened underneath; the outer and middle toes united by a rather large membrane. Entire upper parts variegated with brownish black and pale reddish, the former disposed in irregular and confluent bands, and the latter in spots and imperfect bands; in many specimens the black color predominating on the back, and the pale red on the rump and upper tail coverts. Under parts pale rufous, with transverse lines of brownish black on the breast and sides; under wing coverts and axillaries darker rufous; outer webs of primaries dark brown, inner webs light rufous; secondaries light rufous; tail light rufous, with transverse bars of brownish black. Bill pale yellowish, red at base, brownish black at the end; legs ashy black. Total length about 18 inches; wing, 9; tail, $3\frac{1}{2}$; bill, 4 to 5; tarsus, 3 inches.

Hab.—Entire temperate regions of North America; South America.

The marbled godwit frequents Shoalwater bay in immense flocks during spring and fall, a few remaining all winter. The first flocks of young birds arrive from the north in July, but I think none breed in the Territory. They frequent, during their stay, soft mud flats, which are extensive in the bay, feeding at low tide during either day or night. At high water they sit, concealed by the grass, always at a distance from woods or other concealment of their enemies, and are consequently very difficult to approach, being watchful and shy at all times. Along the gravelly steep shores of the upper part of Puget Sound they rarely appear. In the beginning of May they leave for their northern breeding grounds. I have examined large numbers, and have never identified more than one species in the Territory. The name of "curlew" is commonly, but wrongly, given them.—C.

The godwit is exceedingly abundant in the markets of San Francisco, where I obtained and preserved a specimen in March, 1857. It measured in length 18 inches; extent, 31.25; bill, 4.00.—S.

NUMENIUS LONGIROSTRIS, Wilson.

Long-billed Curlew.

Numenius longirostris, WILSON, Am. Orn. VIII, 1814, 24; pl. lxiv.—SW. F. B. A. II, 1831, 376.—NUTT. Man. II, 1834,

88.—AUD. Orn. Biog. III, 1835, 240; V, 587; pl. 231.—IB. Birds Am. VI, 1843, 35; pl. 355.—

BAIRD & CASSIN, Gen. Rep. Birds, 743.

? *Numenius occidentalis*, WOODHOUSE, Pr. A. N. Sc. VI, Nov. 1852, 194.—IB. Sitgreaves' Expl. Zuni & Col. 1853, 98; pl. vi.

SP. CH.—The largest American species of this genus. Bill very long, much curved; upper mandible longer than the under, somewhat knobbed at the tip; wing rather long; legs moderate; toes united at base. Entire upper parts pale

rufous, tinged with ashy; every feather with transverse and confluent bands of brownish black, most numerous and predominating on the back and scapulars; secondary quills, under wing coverts, and axillaries, bright rufous; primaries with their outer webs brownish black and their inner webs rufous, with transverse bands of black. Under parts pale rufous, with longitudinal lines of black on the neck and sides; tail rufous, tinged with ashy, transversely barred with brownish black. Bill brownish black; base of under mandible reddish yellow; legs bluish brown. Specimens vary to some extent in the shade of the rufous color of the plumage, and very much in the length of the bill. The rufous color is probably more distinct in the young. Total length about 25 inches; wing, 10 to 11; tail, 4; bill, 5 to 8; tarsus, $2\frac{1}{4}$ inches.

Hab.—The entire temperate regions of North America.

Curlews, apparently of this species, are quite common throughout Minnesota, where, while I was attached to the northern Pacific railroad exploration, I observed them in June and July, 1853, very abundant for several hundred miles west of the Mississippi, breeding and rearing their young on the vast prairies of that region.

In Oregon, near Fort Dalles, and in Washington Territory, near the Simcoe and Yakima valleys, they are abundant during the breeding season.

In the vicinity of Puget Sound the long-billed curlew is occasionally seen. During a long residence at Fort Steilacoom I obtained but a single pair, shot on Muckleshoot prairie August 1, 1856. Measurements, in detail, of these were carefully taken, and were as follows: ? male, length, 21.50 inches; extent, 40; wing, 12; bill, 5; tibia, 4.50; tarsus, 3.50. ? Female, length, 20; extent, 36.25; wing, 10.50; bill, 4.50; tibia, 4; tarsus, 3.00.

Both birds had the legs and feet bluish gray; bill dark at the terminal end, reddish dusky at base; iris dark. During the breeding season this species is readily "tolled" towards the gunner by whistling in imitation of its cry. In this they resemble the avosets and yellow-legged tattler.—S.

I observed three times only, during eighteen months' residence near the coast, a curlew of large size, which I supposed to be the long-billed species common near San Francisco. They seemed to be stragglers, and were very shy, alighting only a few minutes at Shoalwater bay, W. T., and then going off southward.—C.

Family RALLIDAE.—The Rails.

RALLUS ELEGANS, Aud.

King Rail; Marsh Hen.

Rallus elegans, AUD. Orn. Biog. III, 1835, 27; pl. 203.—IB. Syn. 21.—IB. Birds Am. V, 1842, 160; pl. 309.—

GUNDLACH, Cab. Jour. 1856, 427.—BAIRD & CASSIN, Gen. Rep. Birds, 746.

Rallus crepitans, WILS. Am. Orn. VII, 1813; pl. lxii, f. 2. (Not the description.)

SP. CH.—The largest species of the United States. Upper parts olive brown, with longitudinal stripes of brownish black, most numerous on the back; line from the base of the bill over the eye dull orange yellow; space before and behind the eye brownish cinereous. Throat and lower eyelid white; neck before and breast bright rufous chestnut; sides and abdomen, and under tail coverts, with transverse bands of brownish black and white, the dark bands being the wider; tibiae dull yellowish white, with spots and transverse bars of ashy brown. Upper wing coverts reddish chestnut; under wing coverts black, with transverse lines of white. Sexes alike. Total length (from tip of bill to end of tail) about 17 inches; wing, $6\frac{1}{2}$; tail, 3.

Hab.—Middle and southern States on the Atlantic ocean; California.—(Dr. Suckley.)

The king rail is very common in the San Francisco market; and I am informed by George Gibbs, esq., that they are abundant on Humboldt bay, further to the north. I have not seen any of this species in the Puget Sound district, but suppose that in favorable localities they are occasionally to be found.

A fine specimen was presented to me in San Francisco by F. Gruber, an excellent practical taxidermist of that city.—S.

RALLUS VIRGINIANUS, Linn.

Virginia Rail; Sora.

Rallus virginianus, LINN. Syst. Nat. I, 1766, 263, (may possibly refer to autumnal *Porzana carolina*)—WILS. Am. Orn. VII, 1813, 109; pl. lxii, f. 1.—BON. Obs. Wils. 1825; No. 210.—NUTT. Man. II, 1834, 205.—AUD. Orn. Biog. III, 1835, 41: V, 573; pl. 205.—IB. Syn. 216.—IB. Birds Am. V, 1842, 174; pl. 311.—CAB. Jour. 1856, 427.—BAIRD & CASSIN, Gen. Rep. Birds, 748.

FIGURES.—EDWARDS' Birds, VI, pl. 279.—WILSON, Am. Orn. VII, pl. 62, fig. 1.—AUD. B. of Am. pl. 205; oct. ed. V, pl. 311.

SP. CH.—Much smaller than either of the preceding, but resembling them in form, and resembling also *R. elegans* in colors. Upper parts olive brown, with longitudinal stripes of brownish black; line from base of bill over the eye reddish white. Throat white; neck before and breast bright rufous; abdomen and under tail coverts with transverse bands of black and white, the former being the wider. Upper wing coverts bright rufous chestnut; under wing coverts black, with transverse lines of white. Total length (from tip of bill to end of tail) about $7\frac{1}{2}$ to 9 inches; extent, $13\frac{3}{4}$; wing, 4; tail, $1\frac{1}{2}$ inches.

HAB.—The entire temperate regions of North America; New Mexico, (Dr. T. C. Henry;) California, (Mr. R. D. Cutts;) Oregon, (Dr. Geo. Suckley.)

I saw one of these birds on the Puyallup marshes, Puget Sound, October 7, 1856. It was on the edge of a small "cat-tail marsh," but escaped before I could get a shot at it. I afterwards obtained a specimen at Port Townsend, Washington Territory, which was found dead during a snow storm, January 5, 1857. The dimensions of this specimen were a little larger than those given in the general report as those usual to the species, being $9\frac{1}{2}$, $13\frac{3}{4}$, $4\frac{1}{8}$, bill $1\frac{3}{8}$. Iris flame red, (perhaps a postmortem change?) Length from bill to end of largest toe, (both drawn to their fullest extent,) 13 inches. Legs dusky yellowish brown, dingy about the flexures of the joints. Tarsus, $1\frac{3}{2}$ -16. From angle of the eye to end of bill, $1\frac{1}{8}$. Bill dusky above and reddish orange beneath; edges and upper mandible near the base reddish orange. Anterior edge of wing white.—S.

The Virginian rail appears to be a rare visitor in the Territory, as I never saw but one, though I resided near marshes suited to their habits, and often looked particularly for them. In the end of September, 1855, I noticed one in such a marsh near the mouth of the Columbia, and, as this species is the most abundant in California, have little doubt of its identity.—C.

FULICA AMERICANA, Gmelin.

Coot; Poule d'eau; Mud Hen.

Fulica americana, GM. Syst. Nat. I, 1788, 704.—BON. Obs. Wils. 1825, No. 234.—AUD. Orn. Biog. III, 1835, 291: V, 568; pl. 239.—IB. Syn. 212.—IB. Birds Amer. VI, 1842, 138; pl. 305.—HARTLAUB, Cab. Jour. I, Extraheft für 1853, 1854, 75; 87.—BAIRD & CASSIN, Gen. Rep. Birds, 751.

Fulica atra, WILS. Am. Orn. IX, 1825, 61; pl. lxxiii.

SP. CH.—Head and neck glossy black, with a tinge of ashy; under tail coverts white. Entire other plumage dark bluish cinereous or slate color, with a tinge of olive on the back and darker on the rump. Edge of wing at shoulder and edge of first primary white; secondary quills tipped with white; rump frequently tinged with brownish. Bill very pale yellow or nearly white, with a transverse band of brownish black near the end; tip white; legs dull grayish green. Female similar, but with the tints lighter. Young like the adult, but with the under parts lighter; abdomen frequently ashy white; back and rump dark olive brown; head and neck lighter.

Total length about 14 inches; wing, 7; tail, 2 inches.

HAB.—Entire temperate regions of North America.

Abundant in all the small weedy lakes of both Territories. I obtained specimens both at Fort Dalles and Fort Steilacoom. In both places the coots were much less shy than the wild ducks of the vicinity.—S.

The coot or mud hen is common in marshes and lakes of the Territory, where it breeds, the young being hatched early in June. It seems, however, like most water birds, to be much more abundant in California during winter, and probably does not remain north of the Columbia at that season.—C.

ORDER VI. NATATORES. Swimming Bird.

Family ANATIDAE.

Sub-Family CYGNINAE.—The Swans.

CYGNUS AMERICANUS, Sharpless.

American Swan.

?*Anas columbianus*, ORD. Guthrie's Geog. 2d Am. Ed. II, 1815, 319; based on Whistling Swan, Lewis & Clark, II, 192.

Cygnus americanus, SHARPLESS, Doughty's Cab. N. H. I, 1830, 185, pl. xvi.—IB. Am. Jour. Sc. XXII, 1831, 83.—AUD.

Orn. Biog. V, 1839, 133; pl. 411.—IB. Syn. 274.—IB. Birds Amer. VI, 1843, 226; pl. 384.—

BAIRD, Gen. Rep. Birds, p. 758.

Olor americanus, BONAP. Consp. Anser. Comptes Rendus, XLIII, Sept. 22, 1856.

Cygnus bewickii, SW. F. Bor. Am. II, 1831, 224.

Cygnus ferus, NUTTALL, Man. II, 1834, 368.

SP. CH.—Bill as long as the head, broad, high at the base; the feathers ending on the forehead in a semi-circular outline. Nostrils far forward, the anterior extremity considerably more forward than half the commissure. Tail of 20 feathers.

Adult pure white; bill and legs black; the former with an orange or yellowish spot in front of the eye. Less mature specimens with the head above tinged with reddish brown. Length, 55 inches; wing, 22.00; tarsus, 4.25; bill above, 4.20.

Hab.—Continent of North America.

The whistling swan is quite abundant during winter on the Columbia, and is found rather more sparingly on Puget Sound. A specimen obtained by me in the vicinity of Fort Steila-coom, on the 24th of October, 1856, measured $53\frac{1}{4}$ inches. Extent, 85; wing, 21. This bird is called by the Nisqually Indians *Swo-kaid*. Its flesh is very delicate, and is excellent for the table.—S.

The American swan is common during winter along the Columbia river above its mouth, but rarely seen near the sea-shore.—C.

CYGNUS BUCCINATOR, Rich.

Trumpeter Swan.

Cygnus buccinator, RICH. F. Bor. Am. II, 1831, 464.—NUTTALL, Man. II, 1834, 370.—AUD. Orn. Biog. IV, 1838, 536;

V, 114; pl. 406 and 376.—IB. Syn. 74.—IB. Birds, Amer. VI, 1843, 219; pl. 382, 383.—BAIRD,

Gen. Rep. Birds, p. 758.

Olor buccinator, WAGLER, Isis, 1832, 1234 —BON. Comptes Rendus, XLIII, Sept. 1856.

SP. CH.—Bill broad, longer than the head; the feathers ending on the forehead in a semi-elliptical outline. The nostrils with the anterior extremity as far forward only as half the commissure. Tail of 24 feathers.

Adult pure white throughout, the bill and legs entirely black; the bill without any red spot at the base. Less mature specimens with the head above tinged with reddish brown.

Length about 50 inches; wing, 24.00; bill above, 4.50; tarsus, 4.60.

Hab.—Western America, from the Mississippi valley to the Pacific.

This bird is undoubtedly an inhabitant of Washington and Oregon Territories. It is, like the preceding species, more abundant on the Columbia river than at Puget Sound. In the

winter of 1853-'54, I noticed immense flocks of swans, apparently of this species, collected along the shores of the river mentioned, and spread out along the margin of the water for a distance varying from an eighth to a quarter of a mile.

I obtained a fine trumpeter swan on Pike lake, Minnesota, in June, 1853. They are quite common on the lakes in that vicinity in summer, breeding and raising their young.—S.

The trumpeter swan associates with the preceding species at the same season and in the same places. Both arrive from the north in the beginning of December, but I have not had an opportunity of noticing their departure. Swans are said to be rare visitors near San Francisco.—C.

Sub-Family ANSERINAE.—The Geese.

ANSER HYPERBOREUS, Pallas.

Snow Goose.

Anser hyperboreus, PALLAS, Spic. Zool. VI, 1767, 80, 25.—SW. F. B. A. II, 1831, 467.—NUTT. Man. II, 344.—AUD.

Orn. Biog. IV, 1828, 562; pl. 381.—IB. Syn. 273.—IB. Birds Amer. VI, 1843, 212; pl. 381.—CASSIN,

Pr. A. N. S. VIII, 1856, 11.—BAIRD, Gen. Rep. Birds, p. 760.

Anas hyperborea, GM. I, 504.—WILS. Am. Orn. VIII, 1814, 76; pl. lxviii and lxix.

SP. CH.—*Adult*: Bill and legs red. Color pure white. Primary quills black towards the end, silvery bluish gray towards the base, where the shafts are white. The spurious quills are also bluish. Inside of wings, except primary quills, white. Immature birds have the head washed with rusty.

Snow geese were seen by me moderately abundant on the shores of Clark's Fork of the Columbia and its branches during my canoe voyage from the St. Mary's valley (Rocky mountains) to Fort Vancouver in 1853. They were much more tame than the brant or other geese I have seen; so much so that myself and party had several shots at a small flock, which we approached so near that I killed a fine individual with my revolver.

I obtained a very good specimen at Fort Steilacoom in December, 1856, where it is not uncommon during the cold months.—S.

The snow goose occasionally stops on the sand bars and prairies along the coast, but the greater part of them seem to go on directly to the plains of California, where they abound in winter.

Geese were seen in August by some of our party on the summit of the Cascade mountains, where they probably breed, in company with ducks, shell-drakes, and cranes. I did not find out which were the species observed.—C.

ANSER GAMBELII, Hartlaub.

White Fronted Goose; Laughing Goose.

Anser albifrons, SW. F. B. A. II, 1831, 456. Not of Gmelin.—NUTT. Man II, 346.—AUD. Orn. Biog. III, 1835, 568;

pl. 280.—IB. Syn. 272.—IB. Birds Amer. VI, 1843, 209; pl. 380.

Anser gambelii, HARTLAUB, Rev. et Mag. Zool. 1852, 7.—BAIRD, Gen. Rep. Birds, 761.

SP. CH.—Tail of sixteen feathers. Bill and legs red. Along sides of bill and forehead white, margined behind with blackish brown. Rest of head and neck grayish brown, becoming pale on the jugulum. Back bluish gray, the feathers anteriorly tipped with brown; the sides similarly colored. The breast and belly grayish white, blotched irregularly with black; the anal region, sides behind, and beneath the tail, with the upper coverts, white. The secondary quills and ends of primaries are dark brown; the remaining portion of primaries and the covert silvery ash. The shafts of quills white. Greater coverts edged with white. Tail feathers brown, tipped with white. Axillars and under surface of wings ashy plumbeous. Length, 28 inches; wing, 16.30; tarsus, 2.88; commissure, 2.04.

Hab.—Whole of North America.

The white-faced goose is very abundant on this coast in fall and spring, but I believe emigrates to California for the winter. Flocks of several hundreds passed the mouth of the Columbia on their way southward as early as September 8. They remain about Shoalwater bay throughout November, feeding almost entirely on the grassy dry plains near the beach, and rarely appearing in the bays except in the middle of the day, when, with several other species, float quietly at a distance from the shore, often asleep, though always watchful.—C.

Very abundant in California, where they may be found in great numbers in the San Francisco markets throughout the winter, and as late in the spring as April 1. This species is given by Dr. Townsend in his list of Oregon birds, but it is by no means as abundant there as either the brant or snow geese. Although occasionally a visitor of Washington Territory, it is so rare that I was unable to obtain a single specimen.—S.

BERNICLA CANADENSIS, (Linn.) Boie.

Canada Goose.

Anas canadensis, LINN. Syst. Nat. I, 1766, 198.—WILS. Am. Orn. VIII, 1814, 52; pl. lvii.

Anser canadensis, VIEILL. Nouv. Dict.—SW. & RICH. F. Bor. Am. II, 1831, 468.—NUTT. Man II, 349.—AUD. Orn. Biog. III, 1835, 1: V, 607; pl. 201.—IB. Syn. 270.—IB. Birds Amer. VI, 1843, 178; pl. 376.

Bernicla canadensis, BOIE, Isis, 1826, 921.—BAIRD, Gen. Rep. Birds, 764.

SP. CH.—Tail of eighteen feathers. Head, neck, bill, and feet, deep black. A large triangular patch of white on the cheeks behind the eye; the two of opposite sides broadly confluent beneath, but not extending to the rami of lower jaw; a few whitish feathers on lower eyelid. Upper parts brown, edged with paler. Under parts light, with a tinge of purple gray, sometimes a shade of smoky brown; the edges of the feathers paler; the color of the body of the feathers, though similar, becoming deeper on the sides, tibia, axillars, and inside of wings. The gray of the belly passes gradually into white on the anal region and under coverts; the upper tail coverts are pure white. The primary quills and rump are very dark blackish brown; the tail feathers are black. Length, 35; wing, 18; tarsus, 3.10; commissure, 2.10.

Hab.—Whole of North America. Accidental in Europe.

The common wild or Canada goose is rarely seen in the bays along the coast, as it takes an interior route in its migration southward. It is common during mild winters in the Columbia valley, near Fort Vancouver. In California the hunters generally consider this species much larger than the Atlantic wild goose, and say that it weighs more. I never had an opportunity of measuring them.—C.

This goose is abundant on the Columbia river, and found sparingly on Puget Sound. Seen also by me in the San Francisco market.—S

BERNICLA LEUCOPAREIA, (Brandt,) Cassin.

Anser leucopareius, BRANDT, Bull. Sc. Acad. St. Petersb. I, 1836, 37, (Aleutians.)—IB. Desc. et Icones Anim. Ross. Aves, fasc. 1, 1836, 13; plate ii.

? *Bernicla leucopareia*, CASSIN, Ill. I, 1855, 272; pl. xlv.

Bernicla leucopareia, BAIRD, Gen. Rep. Birds, 765.

SP. CH.—Tail of eighteen feathers; general appearance that of *A. canadensis*, but much darker; head and neck black, bounded inferiorly by a well defined half ring of white on the throat; a white patch on each cheek, the two confluent below, triangular on the sides and truncate above; the posterior outline perpendicular, the anterior sloping backwards behind the eye, almost exactly as in *A. canadensis*; there is a faint whitish patch on lower eyelids; upper parts dark wood brown, turning gradually into black on the rump, tail and primary quills, each brown feather of the fore back and wings with a rather paler edge. The under parts are very dark brown, as dark as the back of *A. canadensis*, paler along the middle of the belly, the sides as dark as the back; each feather has an obsolete margin of lighter; the region around anus is white, abruptly defined against the brown of the belly; the under and upper tail coverts are white; the bill is quite short, the culmen about half the tarsus, which is decidedly longer than the middle toe. Length, about 35 inches; extent, about 63; wing, 18; tarsus, 3.44; commissure, 1.90.

Hab.—West coast of America.

I obtained a single specimen of this goose at Port Townsend, Puget Sound, in January, 1857. It was brought for sale, with others of the same species, by some Indians of the vicinity, who had shot them on some of the neighboring prairies. My specimen I first took to be the *B. hutchinsii*, (figured by Cassin as *B. leucopareia*?) but as the measurements seemed unusually large, I determined to preserve the skin. The bird measured 34.50 inches in length, 62.50 in extent; wing, (from brachio-carpal joint,) 17.25.

As I understand Mr. Cassin's article on the *A. leucopareias* of Brandt, he seems to consider it identical with *Hutchins' goose*. In this view I concur with Mr. Cassin—i. e., if the deciding point should rest in the *presence or absence* of the white collar and small dimensions of the bird. Specimens of the Hutchins' goose were obtained by me at Fort Steilacoom both *with and without* the white collar, which seems to be a mark peculiar to either age or condition, and *not specific*, as birds differing in this respect were killed apparently from the same flock. [For measurements of Hutchins' geese, see next species.] If the Hutchins' goose takes the synonym of *leucopareia*, then the description at the head of this article, given by Professor Baird, will not apply to that species, and the bird critically examined by the latter—and the only one of the kind in the Smithsonian collection—which was obtained by me at Port Townsend, will probably be called *B. occidentalis*, as recommended by Professor Baird.—S.

BERNICLA HUTCHINSII, (Rich.) Bonap.

Hutchins' Goose.

Anser hutchinsii, RICH. F. Bor. Am. II, 1831, 470.—NUTT. Man. II, 362.—AUD. Orn. Biog. III, 1835, 526; pl. 277.—IB. Syn. 271.—IB. Birds Am. VI, 1843, 198; pl. 377.

Bernicla hutchinsii, BON. List, 1838.—BAIRD, Gen. Rep. Birds, 766.

SP. CH.—Precisely similar to *A. canadensis*, but smaller. Tail of 16 feathers. Tarsus longer than middle toe and claw. Length, (according to the Gen. Rep., *see below*,) 30 inches; wing, 15.80; tarsus, 2.70; commissure, 1.76.

HAB.—Northern and western regions of North America.

As I have stated in the notes on the preceding species, I do not consider the presence or absence of the white collar as a specific character in this species, (the *B. leucopareia* of Cassin.)

A specimen regarded by Professor Baird as *B. Hutchinsii*, got by me at Fort Steilacoom, was identical in habits and plumage (excepting the *ring*) with many others seen and obtained by me in the same locality. Two of these measured less than the standard in the general report.

Length, 27.50 inches; extent, 56.50; wing, from carpal joint, 16.25. Another: 27.50; 54.50; 13.50.

This goose is very abundant on the Nisqually plains in autumn, where, in the early part of the day, their sonorous honking enlivens the senses and is an agreeable music to the ear of the sportsman. At night, and also during the middle of the day, they retire in flocks to the fresh water lakes in the vicinity, where, resting on the surface, they leisurely paddle about or lazily sleep. The name given to this species by the Nisqually Indians is *ah-hah*, a name which is considered to be similar to their honking cry.

They are excellent eating, and, as they subsist almost entirely upon grass, have no fishy or other disagreeable flavor. They arrive on the Nisqually plains about October 1, and continue abundant for two months thereafter. They are also quite abundant at the same season on the "tide prairies" at the mouths of the various rivers emptying into Puget Sound.—S.

Hutchins' brant appears to be the most abundant of the goose tribe along the coast of this Territory, where they appear in large flocks in October, and remain about the bays during most of the winter, disappearing only in the coldest month for a short time. They feed principally on the mud flats at low tide, eating vegetable and animal food which they find there.

Among large numbers that I have examined I have never observed the peculiar differences characterizing the white-necked brant.—C.

BERNICLA NIGRICANS, (Lawrence,) Cassin.

Black Brant.

Anser nigricans, LAWRENCE, ANN. N. Y. Lyc. IV, 1846, 171; plate.

Bernicla nigricans, CASSIN, Ill. I, II, 1853, 52; pl. x.—BAIRD, Gen. Rep. Birds, 1858, 767.

SP. CH.—Head, neck, and body anterior to the wings deep black, passing into dark sooty plumbeous on the rest of the body; this color beneath extending nearly to the anus, and above shading insensibly into the black of the rump. Middle of the throat with a white patch extending round on the sides, and somewhat streaked with black. No white on the eyelids. Sides of rump and of base of tail, with upper and under tail coverts concealing the tail, and space across the anus, white; primary and secondary quills and tail black. Feathers on the sides of the body beneath wings like the belly, but with white tips. The measurements given in the general report are as follows: Length, 29 inches; wing, 13.80; tarsus, 2.30; commissure, 1.50. A female obtained by Dr. Suckley, near Port Townsend, Washington Territory, measured differently: Length, 23.75 inches; extent, 44.75; wing, 12.75; commissure, 1.50; from angle of eye to tip of bill, 2.25; height of bill at the base, 0.87; bill along ridge, 1.31; tarsus, 2.25; tail from tip of coccyx, 3.38. Bill, black; iris, dark (brown?); feet and tarsi, dusky bronze. Lower tail coverts extended slightly beyond tail. Collar on the nape, interrupted behind by an isthmus of black, which, when the feathers were stroked smooth, was about half an inch in width. The collar was mottled by the occurrence of black feathers, and anteriorly was about an inch wide.

On the 20th of January, 1857, I obtained a brant at Sekwim bay, near Port Townsend, Washington Territory, which at once struck me as identical with the *B. nigricans* of Lawrence, and figured by Cassin in his work on the "Birds of California," &c.; and upon comparing the specimen with the description there given, I was pleased to find that it agreed in all essential particulars. The skin was preserved, and is now in the Smithsonian collection; its measurements are those above given. The breast and belly are somewhat lighter than in Cassin's figure, being blackish dusky, with a slight brownish tinge posteriorly. The bird also differs from the common brant in having no white markings on the head. These brant are extremely abundant about the Straits of Fuca in winter.

They appear to prefer the vicinity of the coast, and subsist, by preference, on sedge grass growing near salt water. They also spend much time in the water, being more duck-like in their habits than other geese. I have seen them frequently alight near the shore in salt water, and at other times on bare sand spits, as if in search of small shellfish. The body of this goose is scarcely larger than a mallard's. The specimen skinned was eaten afterwards, and found to be tender and juicy, with but little disagreeable fishy flavor. Their cry appears to be a feeble imitation of the honking of other geese, mixed with sundry noises resembling those of the "old squaws." I may have been deceived in this, as at the time I observed them with reference to their voices they were alarmed and rising, and there were probably some of the latter birds in the vicinity.

In flight this brant is more desultory than other species of geese. I noticed a flock, which probably contained five hundred individuals, which, in rising from the water, broke into twenty or thirty small companies, all apparently flying at random, and but few taking the wedge-shaped order of progression usual to wild geese.—S.

I was told by several gunners, at different times, of a small kind of brant occasionally seen, which was not much larger than a mallard, and had a white ring above the middle of the neck. It was said to keep to the middle of the bay, and to be difficult to shoot. On January 30, 1855, I saw four among a flock of the preceding species swimming near the mouth of the bay. They were about a third less in size, and did not show so much white in their plumage, but were too far off to be seen distinctly. I inquired of hunters in California, but they knew nothing of such a bird.—C.

Sub-Family ANATINAE.—True Ducks.

ANAS BOSCHAS, Linn.

Mallard; Green Head.

Anas boschas, LINN. Syst. Nat. I, 1766, 205.—WILSON, Am. Orn. VIII, 1814, 112; pl. lxx.—AUD. Orn. Biog. III, 1835, 164; pl. 221.—IB. Syn. 276.—IB. Birds Amer. VI, 1843, 236; pl. 385.—BAIRD, Gen. Rep. Birds, 774.

Anas (Boschas) domestica, SW. F. Bor. Am. II, 1831, 442.—NUTTALL, Man. II, 1834, 378.

SP. CH.—Male: Head and neck bright grass green, with violet gloss, the top of the head duller; a white ring round the middle of the neck, below which, and on the fore part and sides of the breast, the color is dark brownish chestnut. Under parts and sides, with the scapulars, pale gray, very finely undulated with dusky; the outer scapulars with a brownish tinge. Fore part of back reddish brown; posterior more olivaceous. Crissum and upper tail coverts black, the latter with a blue gloss. Tail externally white; wing coverts brownish gray, the greater coverts tipped first with white, and then more narrowly with black. Speculum purplish violet, terminated with black; a recurved tuft of feathers on the rump.

Female with the wing exactly as on the male. The under parts plain whitish ochrey, each feather obscurely blotched with dusky. Head and neck similar, spotted and streaked with dusky; the chin and throat above unspotted. Upper parts dark brown, the feathers broadly edged and banded with reddish brown, parallel with the circumference.

Length of male, 23; wing, 11; tarsus, 1.79; commissure of bill, 2.50.

Hab.—Entire continent of North America, and greater part of Old World.

This duck is exceedingly common in the western portion of both Territories. It is especially abundant on the brackish marshes at the mouths of the Nisqually, and other rivers emptying into the sound.

By the Nisqually Indians it is called the “*Haht-haht*,” in imitation of its note of alarm.—S.

The *mallard* is an abundant and resident species in the Territory, frequenting fresh water and small creeks near the sea as long as the ice does not drive it from its feeding grounds, when they sometimes return to the open bays. They build near their favorite waters, though I once saw a nest a quarter of a mile from any pond.—C.

DAFILA ACUTA, (Linn.) Jenyns.

Pintail; Sprigtail.

Anas acuta, LINN. Syst. Nat. I, 1766, 202.—GMELIN, I, 258.—WILSON, Am. Orn. VIII, 1814, f. 2; pl. lxxviii.—AUD. Orn. Biog. III, 1835, 214; V, 615; pl. 227.—IB. Syn. 279.—IB. Birds Amer. VI, 1843, 266; pl. 390.

Phasianurus acutus, WAGLER, Isis, 1832, 1235.

Anas (Dafila) acuta, JENYNS, Man. 1835, 232. Europ. sp.

Dafila acuta, BON. List. 1838.—BAIRD, Gen. Rep. Birds, 776.

Anas (Boschas) acuta, NUTTALL, Man. II, 1834, 385.

Anas caudacula, RAY, SW. F. Bor. Am. II, 1831, 441.

SP. CH.—Tail of 16 feathers. Bill black above and laterally at the base; the sides and beneath blue. Head and upper part of neck uniform dark brown, glossed with green and purple behind. Inferior part of neck, breast, and under parts, white; the white of neck passes up to the nape, separating the brown, and itself is divided dorsally by black, which, below,

passes into the gray of the back. The back anteriorly and the sides are finely lined transversely with black and white. The wings are plain and bluish gray; the greater coverts with a terminal bar of purplish buff, below which is a greenish purple speculum, margined behind by black, and tipped with white. Longest tertials striped with silvery and greenish black. Scapulars black, edged with silvery; crissum and elongated tail feathers black; the former edged with white.

Female with only a trace of the markings of the wing; the green of the speculum brownish, with a few green spots. The feathers of the back are brown, with a broad U or V-shaped brownish yellow bar on each feather anteriorly. Sometimes those bars appear in the shape of broad transverse lines.

Length, 30 to 32 inches; extent, 27; wing, 11; tail, 8.60; tarsus, 1.75; commissure, 2.36.

Hab.—Whole of North America and Europe.

The pintail duck is very abundant on the Columbia river, and also on the fresh water lakes near Puget Sound.—S.

While feeding this duck keeps up a constant gabble. It also, on certain ponds, dives much for its food, bringing up weeds, roots, &c., from the bottom, and, in this respect, somewhat resembling the canvas-back. It is not nearly so shy as the mallard, but more so than the widgeon or teal. It retires to the north early in the spring; this movement is so general, that during the breeding season scarcely a pair is to be seen near Puget Sound.

The pintail duck is found in immense numbers during the coldest winter weather, both in fresh and salt waters, though it seems to prefer the fresh when not frozen over.—C.

NETTION CAROLINENSIS, (G m .) B a i r d .

Green-winged Teal.

Anas carolinensis, Gmelin, Syst. Nat. I, 1788, 533.—Aud. Syn. 1839, 281.—Ib. Birds Amer. VI, 1843, 281; pl. 392.—

Reinhardt. Vid. Med. for 1853, (1854,) 84 (Greenland.)

Anas crecca, Wilson, Am. Orn. VIII, 1814, 101; pl. lxx.—Bon. Obs. No. 263.—Ib. Syn. 386 —Aud. Orn. Biog. III, 1853, 218: V, 616; pl. 228.

Anas (Boschas) crecca, Sw. F. Bor. Am. II, 1831, 400.—Nuttall, Man. II, 1834, 400.

Nettion carolinensis, Baird, Gen. Rep. Birds, 777.

Sp. Ch.—Head and neck all round chestnut; chin black; forehead dusky. Region round the eye, continued along the side of the head as a broad stripe, rich green, passing into a bluish black patch across the nape. Under parts white, the feathers of the jugulum with rounded black spots. Lower portion of neck all round, sides of breast and body, long feathers of flanks and scapulars beautifully and finely banded closely with black and grayish white. Outer webs of some scapulars, and of outer secondaries black, the latter tipped with white; speculum broad and rich green; wing coverts plain grayish brown, the greater coverts tipped with buff. A white crescent in front of the bend of the wing; crissum black, with a triangular patch of buffy white on each side. Lower portion of the green stripe on each side of the head blackish, with a dull edge of whitish below.

Female with the wings as in the male. The under parts white, with hidden spots on the jugulum and lower neck; above dark brown, the feathers edged with gray; iris brown; feet pale gray.

Length, 14 to 15 inches; extent, 24.50; wing, 7.40; tarsus, 1.14; commissure, 1.68.

Hab.—Whole of North America; accidental in Europe.

Extremely abundant in the same situations that the mallard, pintail, and widgeon, are found in. In winter on the northwest coast, as elsewhere, the males and females are found in separate flocks.—S.

The green-winged teal arrives from the south in March, and frequents fresh ponds chiefly, breeding in the Territory. Some, perhaps, remain during mild winters.—C.

QUERQUEDULA CYANOPTERA, (Vieill.) C a s s i n .

South American, Cinnamon, or Red-breasted Teal.

Anas cyanoptera, Vieillot, Nouv. Dict. V, 1816, 104.

Querquedula cyanoptera, Cassin, Illust. I, III, 1855, 84; pl. xv.—Baird, Gen. Rep. Birds, 780.

Anas rafflesii, King, Zool. Jour. IV, 1828, 87.

Pterocyanea rafflesii, Baird, Zool. Stansbury's Exp. Salt Lake, 1852, 322.

SP. CH.—Male: General color a rich dark purplish chestnut, the top of the head, the chin, and middle of belly, tinged with brown. Crissum dark brown. Fore part of the back lighter, with two or three more or less interrupted eccentric bars of dark brown. The feathers of rump and tail greenish brown; the former edged with paler. Wing coverts and outer webs of some scapulars blue; others dark velvet green, streaked centrally with yellowish buff. Edges of greater wing coverts white, as are the axillars and middle of wing beneath. Feathers of flanks uniform chestnut, without bands. Speculum metallic green.

Female with the top of the head dusky and the wing coverts blue, as in the male; the speculum duller. The upper parts dark brown, with lighter edges to the feathers. The under parts are brownish yellow, with a strong tinge of purplish chestnut in the jugulum, the feathers with concealed spots of brown. The only feathers unspotted with brown on the head and neck are in small patches on each side of the base of the bill, and in the chin between the rami. There is an obscure dusky patch beneath the head.

Length, 17.80; wing, 7.50; tarsus, 1.15; commissure, 2.

Hab.—Rocky mountains to Pacific; as far north as the Columbia; accidental in Louisiana; spread over most of western South America.

The South American or red-breasted teal is mentioned by Professor Baird in Stansbury's Report on the United States Exploring Expedition of the Great Salt Lake, as being obtained in that vicinity by Captain Stansbury's party, and as having once before been obtained in Louisiana. Since then many naturalists have demonstrated the abundant existence of this species throughout California. I myself have carried its recorded habitat as far north as the Columbia river, where, at Fort Dalles, in 1855, I obtained several specimens of the species. Fort Dalles is situated on the Columbia river, about latitude $46^{\circ} 45' N$. I presume this forms the most northernmost limit of the species, excepting, perhaps, a narrow point of the same general geographic region which, crossing the Columbia, extends north of Fort Dalles about 100 miles. This is the culmination northwards of the great wedge-shaped northern prolongation of the southern Fauna, occurring in the arid interior of Oregon and Washington Territories.

Near Fort Dalles this teal seems to be an annual summer resident, where it breeds on the lagoons of the Columbia and near the small lakes and pond-holes in the basaltic trap of the vicinity. It seems much less shy than the other wild ducks generally are.

The flesh of this duck compares favorably with that of any other kind. In the San Francisco market it is commonly known as the *cinnamon teal*. The dingy spot on the breast and belly of the male bird is *not* constant; I have killed them both with and without it.—S.

SPATULA CLYPEATA, (Linn) Boie.

Shoveller; Spoonbill.

Anas clypeata, LINN, Syst. Nat. I, 1766, 200.—GMELIN, I, 518.—LATH. Ind II, 1790, 856 —WILSON, Am. Orn. VIII, 1814; pl. lxxvii.—SW. F. Bor. Am. II, 1831, 439.—AUD. Orn. Biog. IV, 1838, 241; pl. 327.—IB. Syn. 283.—IB. Birds Amer. VI, 1843, 293; pl. 394.

Spatula clypeata, BOIE, Isis, 1822, 564.—BAIRD, Gen. Rep. Birds, 781.

Anas (Spathulea) clypeata, NUTT Man. II, 1834, 373.

SP. CH—Head and neck green; fore part and sides of the breast, with greater portion of scapulars, and the sides of the base of the tail, white; rest of under parts dull purplish chestnut; crissum, rump, and upper tail coverts, black, the latter glossed with green. Wing coverts blue; the posterior row brown in the concealed portion, and tipped with white; longest tertial blue, streaked internally with white; others velvet green, streaked centrally with white; speculum grass green, edged very narrowly behind with black and then with white.

Female with the wing similar, but with the blue of coverts and scapulars less distinct. Head and neck brownish yellow spotted with dusky; the belly with a decided chestnut tinge.

Length, 20.00; wing, 9.50; tarsus, 1.38; commissure, 3.02.

Hab.—Continent of North America; abundant in Europe.

The Shoveller or Micoine is rather abundant on the Pacific coast, where I have obtained specimens both at San Francisco and Puget Sound.—S.

The shoveller seems to be only a winter visitor in the Territory, arriving in October and leaving with most of the winter ducks in March or April.—C.

CHAULELASMUS STREPERUS, (Linn.) Gray.

Gadwall; Gray Duck.

Anas strepera, LINN. Syst. Nat. I, 1766, 200.—GMELIN, I, 520.—LATH., Ind. II, 1790, 849.—WILSON, Am. Orn. VIII, 1814, 120; pl. lxxi.—BON. Obs. 1825, No. 257.—AUD. Orn. Biog. IV, 1833, 353; pl. 348.—IB. Syn. 378.—IB. Birds Amer. VI, 1843, 254; pl. 383.—TEMMINCK, Man. II, 838 (European.)

Anas (Chauliodus) strepera, SWAINSON, F. Bor. Am. II, 1831, 440.

Anas (Boschas) strepera, NUTT. Man. II, 1834, 383.

BAIRD, Gen. Rep. Birds, 782.

SP. CH.—*Male*: Head and neck brownish white, each feather spotted with dusky; the top of head tinged with reddish. Lower part of neck, with fore part of breast and back, blackish, with concentric narrow bars of white, giving a scaled appearance to the feathers. Interscapular region, outermost scapulars, and sides of the body finely waved transversely with black and white. Middle wing coverts chestnut, the greater velvet black, succeeded by a pure white speculum, bordered externally by hoary gray, succeeded by black; crissum and upper tail coverts black. Longest tertials hoary plumbeous gray. Innermost scapulars with a reddish tinge. Inside of wing and axillars pure white. Bill black.

Female with the bill dusky, edged with reddish. Wing somewhat like that of the male, but with the chestnut red more restricted. Length, 22; wing, 10.50; tarsus, 1.64; commissure, 2.04.

Hab.—North America generally, and Europe.

This bird is found sparingly on Puget Sound. In 1854 I was fortunate enough, through the kindness of George Gibbs, esq., to obtain a beautiful specimen of the adult male in perfect mature plumage, which was killed in the vicinity of Port Townsend, Puget Sound. A beautiful specimen of this species I saw in March, 1857, in the interesting collection of Mr. Gruber, an enthusiastic taxidermist residing in San Francisco. In both specimens (Mr. Gruber's and my own) the chestnut-red patch on the wing is strongly marked.

In following the line of the survey of the proposed northern route for a Pacific railroad across the continent, most of which fell between the 46th and 48th parallels of north latitude, our party passed through the breeding grounds of vast numbers of ducks. Minnesota, as its Sioux name implies, means the "land of water," (*Minne*, water, *sota*, land or country,) and so, indeed, it is. For 250 miles west of the Mississippi river we were scarcely ever out of sight of some lake or pond, and frequently within the scope of our vision might be seen between 15 and 20 lying around us in different directions, varying in size from that of small pools to that of lakes a mile or more in length. These lakes, all were more or less adapted as breeding places for many species of this family, and, from the numbers of ducks found upon them, their natural advantages did not seem to be neglected. The species were principally mallards and teal, although the gadwall and several others were not uncommon.—S.

MARECA AMERICANA, (Gmel.) Stephens.

Baldpate; American Widgeon.

Anas americana, GMELIN, Syst. Nat. I, 1788, 526.—WILSON, Am. Orn. VIII, 1814, 86; pl. lxxix.—BON. Obs. No. 259.—AUD. Orn. Biog. IV, 1838, 337; pl. 345.—IB. Syn. 1839, 279.

Mareca americana, STEPH. Shaw's Gen. Zool. XII, II, 1824, 135.—SW. F. Bor. Am. II, 1831, 445.—BON. List, 1838.—BAIRD, Gen. Rep. Birds, 783.

Anas (Boschas) americana, Nuttall, Man. II, 1834, 339.

SP. CH.—*Male*.—Tail of 14 feathers. Bill blue, the extreme base and tip black. Head and neck pale buff, or faint reddish yellow, each feather banded narrowly with blackish, so as to give the appearance of spots. The top of the head from the bill is pale, unspotted, creamy white; the sides of the head, from around the eye to the nape, glossy green, the feathers, however, with hidden spots, as described; chin uniform dusky. Fore part of breast and sides of body light brownish or chocolate red, each feather with obsolete grayish edge; rest of under parts pure white; the crissum abruptly black. The back, scapulars, and rump, finely waved transversely anteriorly with reddish and gray, posteriorly with purer gray, on a brown ground; a little of the same waving also on the sides. The lesser wing coverts are plain gray; the middle and greater are conspicuously white, the latter terminated by black, succeeded by a speculum, which is grass green at the base, and then velvet black. The tertials are black on the outer web, bordered narrowly by black, the outermost one hoary gray, externally edged with black. The tail is hoary brown. The upper coverts are black externally. The axillars are white.

The female has the head and neck somewhat similar, but spotted to the bill. Wings as in the male. The black of tertials replaced by brown; the gray of the lesser coverts extending slightly over the middle ones. Back and scapulars with rather broad and distant transverse bars of reddish white, each feather with two or three, interrupted along the shafts. These are much wider and more distant than in the male. Length, 21.75; wing, 11; tarsus, 1.42; commissure, 1.8).

Hab.—Continent of North America. Accidental in Europe.

The widgeon is abundant in the same situations as the pintail, and at Fort Dalles they are more common than any other species. I shot them occasionally in the rock lagoons just above Dalles-town, where I found them much more readily approachable than other species, with the exception of teal. They breed on the small lakes of central Oregon in moderate numbers, and on the northwest coast generally; seem to be next in abundance to the mallard among the fresh water ducks.—S.

AIX SPONSA, (Linn.) Boie.

Summer Duck.

Anas Sponsa, LINN. Syst. Nat. I, 1766, 207.—GM. I, 539.—LATH. Ind. II, 1790, 876.—WILSON, Am. Orn. VIII, 1814 97; pl. lxx.—BON. Obs. No. 261.—AUD. Orn. Biog. III, 1835, 52: V, 618; pl. 206.—IB. Syn. 280.—IB. Birds Amer. VI, 1843, 271; pl. 391.

Aix sponsa, BOIE, Isis, 1828, 329.—BAIRD, Gen. Rep. Birds, 785.

Anas (Boschas) sponsa, NUTTALL, Man. II, 1834, 394.

SP. CH.—Head and crest metallic green to below the eyes; the cheeks and a stripe from behind the eye purplish. A narrow short line from the upper angle of the bill along the side of the crown and through the crest, another on the upper eyelid, a stripe starting behind and below the eye, and running into the crest parallel with the first mentioned, the chin and upper part of the throat, sending a well defined branch up towards the eye and another towards the nape, snowy white. Lower neck and jugulum, and sides of the base of tail, rich purple; the jugulum with triangular spots of white and a chesnut shade. Remaining under parts white, as is a crescent in front of the wing bordered behind by black. Sides yellowish gray, finely lined with black; the long feathers of the flanks broadly black at the end, with a sub-terminal bar, and sometimes a tip of white. Back and neck above nearly uniform bronzed green and purple. Scapulars and innermost tertials velvet black, glossed on the inner webs with violet; the latter with a white bar at the end. Greater coverts violet, succeeded by a greenish speculum, tipped with white. Primaries silvery white externally towards the end; the tips internally violet and purple.

Female with the wings quite similar; the back more purplish; the sides of the head and neck ashy; the region round the base of the bill, a patch through the eyes, and the chin, white. The purple of the jugulum replaced by brownish. The waved feathers on the sides wanting. Male: length, 18 to 19 inches; extent, about 28; wing, 9.50; tarsus, 1.40; commissure, 1.54; iris red; bill yellow and black; feet grayish.

Hab.—Continent of North America.

The wood duck is found sparingly in Washington and Oregon Territories, where I obtained summer specimens at Fort Steilacoom, and winter birds at Fort Dalles. In habits the bird in Oregon does not differ from those found in the middle States.—S.

The summer or wood duck is a summer resident, only arriving in April and leaving about October. Its nests and young are often found in the woods of the interior, but it seems to visit the coast very rarely.—C.

Sub-Family FULIGULINAE.—The Sea-Ducks.

FULIX MARILA, (Linn,) Baird.

Big Black-head; Scaup Duck; Broadbill.

Anas marila, LINN. Syst. Nat. I, 1766, 196 —GM. I, 1788, 509.—WILSON, Am. Orn. VIII, 1814, 84; pl. lxix.

Fuligula marila, STEPH. Shaw's Gen. Zool. Birds XII, II, 1824, 198.—BON. List, 1838.—AUD. Birds Am. VII, 1843, 355; pl. 498.—GIBAUD, Birds L. Island, 1844, 321. (*marila*.)

Aythya marila, BON. List, Birds Europe, 1842.

Fulix marila, BAIRD, Gen. Rep. Birds, 791.

SP. CH.—Head and neck all round, jugulum and shoulders, lower part of back, tail, and coverts black; the head with a gloss of dark green on the sides. Rest of under parts white; feathers on the lower part of belly and on the sides, the long feathers of the flanks, the interscapulum, and the scapulars, white, wayed in zigzag transversely with black. Greater and middle wing coverts similarly marked, but more finely and obscurely. Greater coverts towards the tip, and the tertials, greenish black; the speculum is white, bordered behind by greenish black; the white extending across the whole central portion of the secondaries. Outer primaries and tips of all brownish black; inner ones pale gray; the central line dusky. Axillars and middle of the inferior surface of the wing white. Bill blue black. Legs plumbeous.

Female with the head brown; the region all round the base of the bill white; the undulations of black and white on the feathers wanting, or but faintly indicated above. Length, 20; wing, 9; tarsus, 1.58; commissure, 2.16.

Hab.—Whole of North America and Europe.

The scaup duck is abundant all along the north Pacific coast during the cold months. Several specimens were obtained at Fort Steilacoom.—S.

The scaup duck is a winter species, associating with the golden eye, and others, in creeks and bays, from October till April.—C.

AYTHYA VALLISNERIA, (Wilson,) Bonap.

Canvas-back.

Anas vallisneria, WILSON, Am. Orn. VIII, 1814, 103; pl. lxx.

Fuligula vallisneria, STEPHENS, XII, 1824, 196.—SW. F. Bor. Am. II, 1831, 451.—NUTTALL, Man. II, 430.

Aythya vallisneria, BON. List, 1838.—NEWBERRY, Rep. P. R. R. VI, IV, 1857, 103.—BAIRD, Gen. Rep. Birds, 794.

Fuligula vallisneriana, AUD. Orn. Biog. IV, 1838, 1; pl. 301.—IB. Syn. 1839.—IB. Birds. Amer. VI, 1843, 299; pl. 395.

SP. CH.—Bill long, slender, and tapering. Head all round and neck chestnut; the top of the head and region around the base of the bill dusky brown. Rest of neck, body anterior to the shoulders, back behind, rump and tail coverts, black. Under parts white; the region anterior to the anus, the sides, the interscapulars and scapulars, white, finely dotted in transverse line with black, the white greatly predominating. Speculum bluish gray, lighter externally; the innermost secondaries of the speculum edged externally with black.

Female with the black and chestnut replaced by brown, the cheeks and chin lighter, and some tinged with dull rufous. Length, 20.10; wing, 9.30; tarsus, 1.70; commissure, 2.65.

Hab.—Whole of North America.

The canvas-back duck is found sparingly during the autumn and winter at Fort Dalles, O. T., and at Puget Sound. It is much more abundant in the vicinity of San Francisco, where immense numbers are brought every winter to the markets.—S.

The canvas-back duck is abundant during winter in the bays and rivers; frequenting the Columbia a hundred miles from its mouth.—C.

BUCEPHALA AMERICANA, (Bonap,) Baird.

Golden Eye; Whistle Wing.

Anas clangula, FORSTER, Philos. Trans. LXII, 1772, 365.—WILSON, Am. Orn. VIII, 1814, 62; lxvii.

Fuligula (Clangula) clangula, BON. Syn. 1828, 393.—NUTT. Man. II, 441.

Fuligula clangula, AUD. Orn. Biog. IV, 1838, 318; pl. 342.—IB. Birds Amer. VI, 1843, 362; pl. 406.

Clangula vulgaris, SW. F. Bor. Am. II, 1831, 456. Not of Fleming.

Clangula americana, BONAP. Comp. List, 1838.—EYTON, Mon. Anat. 1838, 167.

Bucephala americana, BAIRD, Gen. Rep. Birds, 796.

SP. CH.—Bill black. Head and upper part of neck glossy green; the under surface opaque velvety purplish black. An elliptical patch along the base of upper mandible anterior to the eye, lower part of neck, under parts generally, and sides, middle and greater wing coverts, the innermost secondaries (and tertials, except the innermost three or four) white. The white on the wing is in a continuous patch, although there is a concealed black bar on the bases of the greater coverts. The inner scapulars are white, margined externally with black, posteriorly, however, they are black, streaked centrally with white. The inner scapulars and tertials, and the whole back, rump, and lesser wing coverts are black; the primaries and tail black, with a hoary gloss. The under side of quills and lower greater coverts are plumbeous gray; the rest of the under wing and the axillars are sooty brown. The long white feathers of the flanks are edged superiorly with black.

Female with the head and neck above snuff brown, without white patch. White of wing less extended; the middle coverts only touched with white. There is a tendency to a black bar across the tips of the greater coverts. The white of the wing sometimes well defined.

Length, 18.75; wing, 8.50; tarsus, 1.50; commissure, 2.

Hab.—Whole of North America.

Specimens of the golden eye duck were obtained by me on Puget Sound, and a female of the same in the second chain of Rocky mountains, (Bitter Root range.) Barrow's golden eye I was unable to identify, although, according to Nuttall, they are common to the Rocky mountains. It seems odd that a nearly identical, yet different, species of duck should be surrounded east and west by its near representative.—S.

The golden eye is very abundant in bays during the winter and early spring. I have only observed the common species among many specimens examined.—C.

BUCEPHALA ALBEOLA, (Linn.) Baird.

Butter Ball; Dipper; Buffle Head.

Anas albeola, LINN. Syst. Nat. I, 1766, 199.—GMELIN, I, 517.—WILSON, Am. Orn. VIII, 1814, 51; pl. lxvii.

Fuligula (Clangula) albeola, BON. Syn. 1828, 394.—NUTT. Man. II, 445.

Fuligula albeola, AUD. Orn. Biog. IV, 1838, 217; pl. 325.—IB. Syn. 1839, 293.—IB. Birds Amer. VI, 1843, 369; pl. 408.

Bucephala albeola, BAIRD, Gen. Rep. Birds, 797.

SP. CH.—Male.—Bill blue. Head and neck anteriorly dark colored; the region in front of the eye and on the sides of the collar behind rich green; this color shading into purplish on the upper and under surfaces of the head; a broad patch on each side of the head from the posterior border of the eye, and meeting its fellow on the nape, the lower neck all round, under parts generally, wing coverts, (except the lesser,) and most of the secondaries, and the scapulars, white; the latter narrowly edged externally with black. Rest of upper parts, except as described, black; passing gradually on the upper tail coverts into pale gray. Axillars and under wing coverts sooty brown, more or less tipped with white.

Female with the entire head, neck, and upper parts almost black. An elongated patch behind and below the eye, (not reaching it.) The outer webs of some secondaries, and the under parts, white; the jugulum, sides, and anal region, plumbeous gray.

Length, 15; extent, 23 to 25; wing, 6.65; tarsus, 1.25; commissure, 1.44.

This duck is extremely abundant throughout the length and breadth of Washington Territory. I observed them on the Rocky Mountain streams, and also upon the salt waters of Puget Sound. They seem to repair indiscriminately to fresh, salt, and brackish waters, and

to have but little choice whether they alight in muddy pools, quiet millponds, running brooks, or in the surf of the ocean. At Fort Steilacoom, where this species first arrives from the north in the fall, the individuals are very fat, and in good order for the table. At this time they are not at all shy; but by mid-winter they are generally lean, tough, and unsavory; and, probably on account of their great powder experience, are much more shy and wary. As divers they almost equal the dab-chick in dexterity. I once saw a male that I had just wounded dive in clear water, and, seizing hold, by its bill, of a root growing under water, remain voluntarily submerged for almost five minutes, until he supposed all danger past, when, again ascending to the surface, he paddled off with great rapidity. It is said that *loons* also possess this instinctive cunning, and frequently, when wounded, seize hold of eel grass, &c., on the bottoms of ponds, &c., where occasionally, becoming entangled, they die.—S.

The buffle head, or butter duck, is only a winter resident, though it remains as late as May. They frequent both fresh and salt waters, and seem especially fond of rapid rivers.—C.

HISTRIONICUS TORQUATUS, Bonap.

Harlequin Duck.

Anas histrionica, LINN. Syst. Nat. ed. 10, I, 1758, 127; ed. 12th, I, 1766, 204.—GMELIN, I, 534.—LATH. Ind. Orn. II, 1790, 849.—WILSON, Am. Orn. VIII, 1814, 139; pl. lxxii.

Fuligula (Clangula) histrionica, BON. Syn. 1828, 394.—NUTTALL, Man. II, 448.

Fuligula histrionica, AUD. Orn. Biog. III, 1835, 612; V, 1839, 617; pl. 297.—IB. Syn. 1839, 294.—IB. Birds Amer. VI, 1843, 374; pl. 409.

Clangula histrionica, SWAINSON, F. Bor. Am. II, 1831, 489.

Histrionicus torquatus, BONAP. Comptes Rendus, XLIII, Sept. 1856.—BAIRD, Gen. Rep. Birds, p. 799.

SP. CH.—*Male*. Head and neck all round dark blue. Jugulum, sides of breast, and upper parts, lighter blue, becoming bluish black again on the tail covers. The blue of breast passes insensibly into dark bluish brown behind. A broad stripe along the top of head from the bill to the nape, and the tail feathers, black. A white patch along the entire side of the base of bill anterior to the eye, and passing upwards and backwards so as to border the black of the crown, but replaced from above the eye to the nape by chestnut. A round spot on the side of the occiput, an elongated one on the side of the neck, a collar round the lower part of the neck, interrupted before and behind, and margined behind by dark blue, a transversely elongated patch on each side of the breast, and similarly margined, a round spot on the middle wing coverts, a transverse patch on the end of the greater coverts, the scapulars in part, a broad streak on the outer web of tertials, and a spot on each side the rest of the tail, white; sides of body behind chestnut brown. Secondaries with a metallic speculum of purplish or violet blue. Inside of wing, and axillars, dark brown.

Female with the head and body above, dark brown; the chin more plumbeous; the lower part of neck, breast, and under parts generally, except the central region, (which is white,) duller and lighter brown; a whitish patch in front of the eye, and a rounded spot just behind the ear.

Length, 17.50; wing, 7.70; tarsus, 1.48; commissure, 1.54.

Hab.—Northern seacoast of northern hemisphere.

The beautiful harlequin duck is, in winter, found sparingly on Puget Sound, where I obtained three specimens; one of which, in most beautiful plumage, was presented to me by Lieutenant Murden, of the United States revenue service, a gentleman to whom I was indebted for many similar favors in other branches of natural history. It seems, when not breeding, to be almost exclusively a salt water species, and, although Puget Sound is almost as salt at its head as it is near the ocean, it is rarely found more than eighty miles from its mouth, *i. e.*, about half way up, where the sound is still wide, thus showing a predilection for rough water, and no special liking for the placid waters of the quiet inlets and coves near its head.—S.

HARELDA GLACIALIS, (Linn.) Leach.

South Southerly; Old Wife; Long-tail.

Anas glacialis, LINN. Syst. Nat. I, 1766, 203.—FORSTER, Phil. Trans. LXII, 1772, 418.—WILSON, Am. Orn. VIII, 1814, 93, 96; pl. lxx.

Harelda glacialis, "LEACH."—STEPHENS, Shaw's Gen. Zool. XII, 1824, 175.—Sw. F. B. Am. II, 1831, 460.—Bon. List, 1838.—BAIRD, Gen. Rep. Birds, 800.

Fuligula (Harelda) glacialis, NUTT. Man. II, 1834, 453.

Fuligula glacialis, AUD. Orn. Biog. IV, 1838, 403; pl. 312.—IB. Syn. 1839, 295.—IB. Birds Amer. VI, 1843, 379; pl. 410.

Anas hyemalis, LINN. I, 1766, 202.—FORST. Phil. Tr. LXII, 1772, 418.—GMELIN, I, 529.

SP. CH.—*Male in summer*.—Bill black, orange yellow towards the tip. Head, neck, and breast very dark blackish brown; the head above, back, rump, and middle tail feathers, black. The whole side of the head, from the bill and to behind the eyes, and the sides of the body, pale bluish gray; the portion of the cheek patch immediately around and behind the eye, with a longitudinal streak each side the occiput; the under parts generally, and the more external tail feathers, white. Feathers on the fore part of the back, with the scapulars, broadly edged with light reddish brown; under wing coverts and axillars brownish chocolate. No white whatever on the wing.

Male in winter.—Differs from summer dress in having the head and neck white to the jugulum and interscapular region. The gray of the cheeks persistent, and a broad patch of black on the sides of the neck behind this. The scapulars are pale pearl gray. Iris pale brown.

Female.—Lacks the long points to the tail and scapulars. The head and neck dusky, with a whitish patch around the eye and on the sides of the neck behind.

Length, 20.75; wing, 8.90; tail, 8.00; tarsus, 1.38; commissure, 1.62. Extent of wings about 30 inches.

Hab.—Along both coasts of North America. Europe.

The long-tailed duck, "old wife," or "south southerly," remains in the Territory only during the coldest winter months, leaving for the north in March. They are found only in open bays.—C.

The "old squaw" is very common in winter on the lower part of Puget Sound and on Admiralty inlet. I am sorry that the only specimen I attempted to preserve was accidentally destroyed.

The Indians living along the Straits of Fuca look to the arrival of the various species of wild ducks as a certain harvest. They destroy vast numbers by shooting with shot, and, when short of ammunition, with forked arrows. They also obtain them in great quantities by stretching long nets on a line suspended on poles, which are about half as far apart and look much like the telegraph poles of the older States. These poles are erected on the long sand spits running out from points, and dividing bays along the straits. Upon these the nets are stretched at nightfall, and, being directly in the course of the flight of the birds from bay to bay and point to point, immense numbers are taken at certain seasons. This plan of capturing ducks was much more extensively practiced formerly than at present. The same Indians save large quantities of wild duck and geese feathers, which are readily bought up by the traders for about twelve cents a pound, and resold by them in San Francisco at a profit of several hundred per cent.

Some tribes of Indians, especially the Lummis and Scadgetts, have a habit of obtaining ducks at night by "fire hunting," with canoes and lights, much in the same manner that deer are killed in certain districts. The ducks, dazzled and bewitched by the light, allow it to approach so near that they are killed with arrows and spears. It is not unusual thus to take a good sized canoe-load in a single night. By this method fire-arms should not be used; but the arrow or spear, doing its work noiselessly, is alone to be relied on.—S.

MELANETTA VELVETINA, (Cass.) Baird.

Velvet Duck; White-winged Coot.

Anas fusca, WILSON, Am. Orn. VIII, 1814, 137; pl. lxxii. Not of Linnaeus.

Fuligula (Oidemia) fusca, BON. Syn. 1828, 390.—NUTT. Man. II, 1834, 419.

Fuligula fusca, AUD. Orn. Biog. III, 1835, 454; pl. 247.—IB. Syn. 1839, 280.—IB. Birds Amer. VI, 1843, 332; pl. 401.

Oidemia velvetina, CASSIN, Pr. A. N. Sc. V, Oct. 1850, 126.

Melanetta velvetina, BAIRD, Gen. Rep. Birds, 805.

SP. CH.—*Male*.—Bill very broad, wider towards the tip than at the base; feathers extending far along the side of the bill, and on the forehead, for nearly half the commissure, running in an obtuse point about as far forward as the lower corner of the outline of feathers on the side, both reaching nearly to the posterior border of the large, open, nearly rounded nostrils; culmen horizontal a little beyond the frontal feathers, then abruptly bent downwards, nearly perpendicularly, to the much depressed, nearly horizontal portion; a sharp indented ridge along the base of culmen, ending in a trihedral tubercle. Color black; a white elongated patch around and a little behind the eye, and a large white speculum on the wing composed of white secondaries and tips of greater coverts; bill black at base and lateral edges; red elsewhere.

Female somewhat similar, but lighter beneath, and smaller; a large whitish patch on the side of the head behind the eye, but none around it; wings with white speculum, somewhat as in the male; bill also similar, but less swollen and elevated at base. Length, from 20 to 23 inches; extent, from 36 to 39.25; wing, 10.16 to 12; tarsus, 2.08; commissure, 2.82. Iris of the male, pale gray, or grayish white; of the female, brown.

Hab.—Along both coasts of North America, to the north.

The white-winged coot, or velvet duck, is common in winter in all the bays and inlets of Puget Sound. I obtained four or five specimens at Fort Steilacoom. In common with other of the dark colored, fishy, sea ducks, it is called by the Nisqually Indians *kwal'-hoo*. They arrive in that vicinity about the middle of October, and continue plentiful until about the 1st of April, when they nearly all disappear. They are almost always found on salt water, but I have occasionally heard of one being killed inland. When fat they rise from the water with difficulty, beating it with their wings for a long distance. The flesh is oily, and possesses a strong, and to many a disagreeable, fishy flavor. This is, however, much prized by the Indians, who, for eating, prefer them to mallards.—S.

The black or velvet scoter is common in winter about bays and estuaries, together with the other two species of surf duck, but none of them seem to breed in the Territory, though a few linger in the bays all summer, which may be superannuated specimens.—C.

PELIONETTA PERSPICILLATA, Kaup.

Surf Duck; Sea Coot.

Anas perspicillata, LINN. Syst. Nat. I, 1766, 201.—WILSON, Am. Orn. VIII, 1814, 49; pl. lxxvii.

Fuligula (Oidemia) perspicillata, BON. Syn. 1828, 389.—NUTTALL, Man. II, 416

"*Pelionetta perspicillata*, KAUP," REICH. Icones Av.—BONAP. Comptes Rendus, XLIII, Sept. 1856.—BAIRD, Gen. Rep. Birds, 806.

Fuligula perspicillata, AUD. Orn. Biog. IV, 1838, 161; pl. 317.—IB. Syn. 289.—IB. Birds Am. VI, 1843, 337; pl. 402.

SP. CH.—*Male*.—Tail of 14 feathers. Bill but little longer than the head, the feathers extending forward half way from the base to the tip, and opposite the posterior border of the nostril; the bill abruptly decurved or gibbous anterior to the end of the feathers; nostrils open, nearly semicircular or stirrup shaped, the straight portion of the outline antero-inferior; sides of bill swollen at the base so as to be further apart above than below.

Color entirely black throughout, with a greenish lustre above, duller beneath; a triangular white patch on the top of head, the base extending between the posterior outline of the eye and reaching forward to a point a little beyond the posterior line of the bill, the outlines rounded laterally and anteriorly; the patch is separated from the eye by a narrow superciliary black space. There is a second triangular white patch beginning on the nape as a straight line, the width of the other patch, and running backwards for more than two inches. These triangular spaces are thus base to base. Iris white; bill and feet variegated.

Female.—Bill as long as that of the male, but not swollen at the base, where the sides approach each other above; the feathers

of forehead do not extend one-third the distance from base to tip of bill; the middle of nostril not quite as far as the middle of the bill; nostrils linear, acutely pointed anteriorly.

Color brown; lighter on the neck. Sides and beneath the under surface of the body whitish. An obscure whitish patch at the base of the bill, and another on the side of the head behind the eyes.

Length of male, 19.00 to 20.00; wing, 9.40; extent, 33; tarsus, 1.63; commissure, 2.37.

Hab.—On and near the seacoast of North America, quite far south in winter. Accidental in Europe.

A fine *albino* specimen of this duck is in the collection of Mr. F. Gruber, at San Francisco.

The sea coot is quite common in winter on Puget Sound, where it frequents the same localities as the preceding species, and has much the same habits as elsewhere. I obtained several specimens at Fort Steilacoom.—S.

The surf duck or spectacled scoter frequents the same situations as the preceding in winter.—C.

OIDEMIA AMERICANA, Swainson.

Scoter.

Anas nigra, WILSON, Am. Orn. VIII, 1814, 135; pl. lxxii. Not of Linnaeus.

Anas (Fuligula) nigra, BON. Obs. Wilson, 1825, No. 267.

Fuligula (Oidemia) nigra, BON. Syn. 1828, 390.

Oidemia americana, SWAINSON, F. Bor. Am. II, 1831, 450.—BON. List, 1838.—BAIRD, Gen. Rep. Birds, 807.

Fuligula americana, AUD. Orn. Biog. V, 1839, 117; pl. 408.—IB. Syn. 290.—IB. Birds Amer. VI, 1843, 343; pl. 403.

SP. CH.—Male.—Tail of sixteen feathers. Bill much swollen on the basal third: the basal portion of culmen convex and rapidly descending; the terminal portion of bill much depressed; the anterior extremity of nostrils half way from the lateral or upper feathers at the base of bill to the tip. The swelling at base of bill divided by a furrow along the median line. The frontal feathers extend slightly forward in an obtuse point. Bill of female not very dissimilar, lacking the swelling at the base.

Color entirely black all over, without any white. Bill black along the edges and tip; the swollen basal portion red to beyond the nostrils.

Female.—Brown; lighter on sides of head, throat, and under surface of body, where the feathers have each an obscure dusky spot.

Length, 23.80; wing, 9.20; tarsus, 1.78; commissure, 2.14.

Hab.—Seacoast of North America.

The American scoter is less common than the other kinds, and has the same habits.—C.

The scoters generally arrive from the north in the bays and inlets of Puget Sound about October 1, remaining in greater or less numbers throughout the winter. Their flight is low, labored, and heavy; their journeys appearing to be carried on, for the most part, by short stages. In these characteristics they resemble closely the two preceding species. They also are excessively fat in winter, and have a disagreeable, strong odor, and fishy taste. A specimen obtained by me at Fort Steilacoom is now in the Smithsonian collection, marked 4,574.—S.

Sub-family MERGINAE. The Sheldrakes.

MERGUS AMERICANUS, Cassin.

Goosander; Sheldrake; Fish Duck.

Mergus merganser, WILS. Am. Orn. VIII, 1814, 68; pl. lxxviii.—SW. F. Bor. Am. II, 1831, 461.—NUTT. Man. II, 1834,

460.—AUD. Orn. Biog. IV, 1838, 261; pl. 331.—IB. Syn. 1839, 297.—IB. Birds Amer. VI, 1843, 387; pl. 411.

Mergus americanus, CASSIN, Pr. A. N. Sc. VI, 1853, 187.—BAIRD, Gen. Rep. Birds, 813.

Merganser castor, var. *A. americanus*, BON. Comptes Rendus, XLIII, 1856.

SP. CH.—Feathers of the forehead extending on the bill in an acute angle for half the distance between those on the sides

and the nostril; outline of those on the sides nearly vertical and reaching but little beyond the beginning of lower edge of bill, but as far as those on the side of lower jaw. Nostril large, far forward, its middle opposite the middle of the commissure.

Male.—Head without conspicuous crest. Head and neck green. Fore part of back black; beneath salmon color. Wings mostly white, crossed by one band of black. Sides scarcely barred transversely.

Female.—Head with a compressed occipital crest. Head and neck chestnut. Above ashy; beneath salmon colored. White of greater coverts with a terminal bar of ashy, (sometimes wanting;) the black of base of secondaries entirely concealed. Outer tertials, ash.

Length, 26.50; wing, 11.00; tarsus, 1.84; commissure, 2.90.

Hab.—Whole of North America.

The American sheldrake or merganser is abundant during the warmer months, and some even remain all winter, leaving their favorite rivers for the open bays. They are found, in summer, in almost every small lake and mountain stream, though the males are not so often seen there as the females, with their broods of young. In September the young, being fully fledged, associate in flocks of several hundreds, in which I have never seen any adult males. In January these last are seen in small flocks by themselves, with the head and neck in perfect green plumage.—C.

The common goosander or American sheldrake is very frequently found near Fort Steilacoom and upon the Columbia river in winter. They are very widely distributed throughout both Territories. I shot a female in the Bitter Root chain of the Rocky mountains in October, 1853, where they were quite abundant on the branches of Clark's river. Near Fort Steilacoom they are scarce in summer, the greater number, probably, retiring to the recesses of the Cascade mountains or further north to breed.—S.

MERGUS SERRATOR, Linn.

Red-breasted Merganser.

Mergus serrator, LINN. Syst. Nat. I, 1766, 208.—GM. I, 546.—WILSON, Am. Orn. VIII, 1814, 81; pl. lxix.—SW. F. Bor. Am. II, 1831, 462.—NUTTALL, Man II, 1834, 463.—AUD. Orn. Biog. V, 1839, 92; pl. 401.—IB. Syn. 298.—IB. Birds Am. VI, 1843, 395; pl. 412.—BAIRD, Gen. Rep. Birds, 814.

Merganser serrator, STEPH. Shaw's Gen. Zool. XII, 1824, 165.—BON. List, 1838.

SP. CH.—Feathers of the forehead extending on the bill in a short obtuse angle, and falling far short of the end of those on the sides; the outline of the latter sloping rapidly forward, and reaching half way from the posterior end of the lower edge of bill to the nostrils, and far beyond those on the side of lower jaw. Nostrils narrow, posterior; their posterior outline opposite the end of basal third of commissure.

Male.—Head with conspicuous pointed occipital crest. Head and upper part of neck, all around, dark green; under parts reddish white. Jugulum reddish brown, streaked with black. Sides conspicuously barred transversely with fine lines of black. Feathers anterior to wing, white, margined with black. White of wing crossed by two bars of black.

Female.—Head with compressed occipital crest; chestnut brown. Body above ash; beneath reddish white. The black at base of secondaries exposed; outer tertials white, edged with black.

Length, 23.25; wing, 8.60; tarsus, 1.80; commissure, 2.76.

Hab. Whole of North America and Europe.

I obtained one specimen of this merganser at Fort Steilacoom, where it is not uncommon. In habits it closely resembles the preceding species.—S.

The red-breasted sheldrake is common from September to April, but I have not obtained them during summer, though it is not unlikely that they breed in some parts of the territory. The shyness of these birds in summer makes it difficult to distinguish this from the last species as they fly.—C.

LOPHODYTES CUCULLATUS, (Linn.) Reich.

Hooded Merganser.

Mergus cucullatus, LINN. Syst. Nat. I, 1766, 207.—GMELIN, I, 544.—WILSON, Am. Orn. VIII, 79; pl. lxxix —BON. Obs. No. 251.—SW. F. Bor. Am. II, 1831, 463.—NUTTAL, Man. II, 465.—AUD. Orn. Biog. III, 1835, 246: V, 619; pl. 233.—IB. Syn. 299.—IB. Birds Amer. VI, 1843, 402; pl. 413.

Lophodytes cucullatus, REICH. Systema Avium, 1852, p. ix.—BONAP. Comptes Rendus, XLIII, 1856.—BAIRD, Gen. Rep. Birds, 816.

SP. CH.—Head with an elongated, compressed, semicircular crest. Anterior extremity of nostrils reaching not quite as far as the middle of commissure. Frontal feathers extending nearly as far as half the distance from lateral feathers to nostril; the latter much beyond the feathers on side of lower mandible. Bill shorter than head.

Male.—Bill black. Head, neck, and back black; under parts and centre of crest white. Sides chestnut brown, barred with black. White anterior to the wing, crossed by two black crescents. Lesser coverts gray; white speculum with a basal and median black bar; black tertials streaked centrally with white.

Female with a shorter and more pointed crest. The head and neck reddish brown; the back without pure black; the sides without transverse bars; the white of wings less extended.

Length, 17.50; wing, 7.90; tarsus, 1.20; commissure, 1.98

Hab.—Whole of North America.

The beautiful hooded merganser is extremely common in winter on the fresh water lakes near Fort Steilacoom, where I obtained several fine specimens of both sexes. They also breed sparingly in the neighborhood.

In the summer of 1856 I shot one out of a brood of half grown young, which were being reared on a small sluggish stream near the garrison garden. Being but slightly wounded it showed great dexterity in swimming, diving, and hiding, and other spirited endeavors to escape. The rest of the brood, being unharmed, took to the shore and managed most successfully to hide in the long grass near the water. The individual shot was about two-thirds grown, and seemed to be in color an exact miniature of the adult female.—S.

The hooded merganser is often shot in winter, but I never saw it during summer in the Territory.—C.

Family PELECANIDAE. The Pelicans.

PELECANUS ERYTHORHYNCHUS, Gmelin.

Rough-billed or White Pelican.

Pelecanus erythrorhynchus, GM. Syst. Nat. 1788, 571.

Pelecanus trachyrhynchus, LATH. Ind. Orn. II, 1790, 884.—BON. Comp. List, 1838, 60.—GRAY, Gen. of Birds, 1845, 309.

Cyrtopelicanus trachyrhynchus, BON. Cons. Av. II, 1855, 163.

Pelecanus onocrotalus, BON. Syn. 1828, No. 351.—RICH. and SW. F. Bor. Am. II, 1831, 472.—NUTT. Man. II, 1834, 471.

Pelecanus americanus, AUD. Orn. Biog. IV, 1838, 88.—IB. Syn. 1839.—IB. Birds Am. VII, 1844, 20; pl. ccccxii.

SP. CH.—Head with a yellow occipital crest; bill yellow, sub-maxillary pouch very large; general color white; primaries black, second the longest; legs and feet very strong.

Adult male.—The general plumage is pure white; in the breeding season, with a roseate tinge; the crest and elongated feathers on the breast pale yellow; the alula, primary coverts and primaries black, the shafts of the latter white for the greater part of their length, being brownish black at the end; the outer secondaries black, the inner more or less white, the shafts of all white underneath. Bill yellow, with the edges and unguis reddish; upper mandible high at the base, but becoming gradually flattened to the end; on the ridge just beyond the middle of the bill is a thin elevated bony process about one inch high, and extending towards the end for three or four inches; lower mandible broad at the base, with the crura separated nearly to the point; underneath the lower mandible, beginning at the junction of the crura, and extending down the neck for about eight inches,

is a large membranous sac or pouch, capable of great expansion; it is of the same color as the bill; bare space around the eye bright yellow; iris white; legs and feet yellow; claws yellowish brown.

The female differs in not having the bony projection on the upper mandible.

Total length, 70 inches; wing, 24.50; bill, 13.50; tarsi, 4.75; tail, 7.

Hab.—Throughout the United States, rare on the coasts of the middle and northern States. Fur countries up to the 61st parallel.

The rough-billed pelican is common at San Francisco, where I obtained a very fine specimen in January, 1856. This species may extend as far north as the Columbia, but I have myself not seen it beyond the locality first mentioned.—S.

This bird I have seen along the Platte river, Nebraska, in October, on its way south, and from its far northern range in the interior, and from its being abundant in Utah, I have no doubt of its occurring in some seasons in the interior of Washington Territory, though not seen there by me, nor did I see it at Shoalwater bay, or elsewhere on the coast north of San Francisco.—C.

PELECANUS FUSCUS, Linnaeus.

Gray or Brown Pelican.

Pelecanus fuscus, LINN. Syst. Nat. 1766, 215.—BON. Syn. 1828, No. 352.—NUTT. Man. II, 1834, 476.—AUD. Orn. Biog. III, 1835, 376; V, 1839, 212.—IB. Syn. 1839.—IB. Birds Am. VII, 1844, 32; pl. ccccxiii and ccccxiv.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 870.

Onocrotalus fuscus, BON. Cons. Av. II, 1855, 163.

SP. CH.—Head with a short occipital crest of light reddish brown; bill grayish white, more or less dusky, and marked with pale carmine spots; a large pouch appended to the under mandible; below the color is very dark ash, above hoary; second primary longest; legs stout.

Adult male.—Head white, except on the fore part, where it is yellow; sides of the neck adjoining the pouch white; hind part of neck and lower part in front dark chestnut brown, the short crest pale reddish brown; back and wings grayish ash, with dusky margins, the former color prevailing on the larger wing coverts and scapulars; primaries brownish black, secondaries dark ashy brown, with their outer margins grayish white; shafts of the primaries white until near the end, when they become black; tail grayish ash, with the shafts of the feathers white for one-half their length; terminal half black; under plumage dark brownish ash, with the sides of the body from the neck for its entire length, marked with narrow longitudinal white lines; on the lower part of the neck is a small patch of pale yellow; bill grayish white, tinged with brown and intermixed with spots of pale carmine; the lower mandible blackish at the end, and having underneath a large pouch similar in character to that of the preceding species, but of a greenish black color, with the ridges formed by the wrinkles paler; bare skin surrounding the eye deep blue; iris white, the eyelids pink; legs and feet black.

The plumage of the fully adult female is similar in color to that of the male; the feathers of the head are rather rigid, not downy as in the male.

In the young the plumage generally is of a dusky brown.

Length of male, 56 inches; wing, 22; bill, 13.50; tarsi, 3; tail, 6.50. Young, length 48 inches; extent, 57.50.

Hab.—From Texas to North Carolina; California coast.

About September 1 the gray or "brown" pelican enters Shoalwater bay in large flocks, which remain until November. They feed principally during rising tide, wandering in long trains over the channels, and diving occasionally one after the other, sometimes scattering and fishing singly. They rest, during the intervals, on a large sand island in the mouth of the bay. I have never seen them in their spring migrations northward.—C.

Family PHALACROCORACIDAE.—The Cormorants.

Graculus, Bonap.

GRACULUS DILOPHUS, (Sw.) Gray.

Double-crested Cormorant.

Pelecanus (Carbo) dilophus, Sw. Faun. Bor. Am. II, 1831, 473.

Phalacrocorax dilophus, NUTT. Man. II, 1831, 483.—AUD. Orn. Biog. III, 1835, 420: V. 1839, 628.—IB. Syn. 1839, 302.—IB. Birds Am. VI, 1844, 423; pl. ccccxvi.

Graculus dilophus, GRAY, Gen. of Birds, 1845.—BON. Cons. Av. II, 1855, 172.—BAIRD & LAWRENCE, Gen. Rep. Birds, 877.

Carvo dilophus, GAMB. Jour. Acad. Nat. Sc. Phil. 2d Ser. I. 1849, 247.

SP. CH.—Greenish black; behind each eye a recurved crest of loose feathers; gular sac orange; second quill longest; tail of twelve feathers.

Adult.—The plumage of the head, neck, lower part of the back and entire under surface is greenish black, the feathers of the upper part of the back, the wing-coverts, the scapularies and tertiaries, grayish brown or dark ash, the margins of which are greenish black; primaries blackish brown, lighter on the inner webs; the secondaries dark grayish brown; tail black, as are also the shafts; running from the bill over the eye is a line of white filamentous feathers, there are also a few of the same character sparsely distributed over the neck; behind each eye is a tuft of rather long slender feathers, erect and curving forwards; bare space in the region of the eye, and gular sac orange; upper mandible blackish brown, with the edges yellowish; lower yellow, marked irregular with dusky; iris bright green; legs, feet, and claws black, claw of the middle toe pectinated.

Length, 34 inches; extent, 51.50; wing, 13; tail, 6.75; bill, 2.85; tarsus, 3.50; outer toe and claw, 4; inner, 2.50; hind, 1.75.

Hab.—Atlantic coast from Labrador to Carolina; fur countries; Pacific coast from Washington Territory to California.

The double-crested cormorant is very common during spring and fall, in the larger rivers of the Territory, west of the Cascade mountains, where they generally sit on some snag or stump in the water watching for fish, or sunning themselves like vultures after eating, with their wings half-spread. They are very watchful, and rarely let a boat approach within gunshot, though they often stupidly fly close to it, after starting off. In winter they abound in the open bays and mouths of rivers, but in summer appear to retire to more northern regions. I have never heard them make any sound. When wounded they swim and dive so rapidly that it is useless to pursue them. They roost on cliffs and trees at night.—C.

Rather common on Puget Sound, where I obtained a specimen in February, 1856. Individuals of this species are fond of alighting on drift logs, and thus float about with the tides and currents, apparently greatly enjoying their mode of travel.

Immense numbers of cormorants are found in flocks on the rocky islands near Bellingham bay.—S.

GRACULUS VIOLACEUS, (Gmelin,) Gray.

Violet-Green Cormorant.

Pelecanus violaceus, Gm. Syst. Nat. I, 1789, 575.

Graculus violaceus, GRAY, Gen. of Birds, 1845.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 881.

Phalacrocorax resplendens, AUD. Orn. Biog. V, 1839, 148.—IB. Syn. 1839, 304.—IB. Birds Am. VI, 1843, 430; pl. ccccxix.

Urile bicristatus, BON. Cons. Av. II, 1855, 175.

SP. CH.—Violet-green; narrow white feathers are sparingly distributed on the sides of the neck and hind part, and sides of the body; gular sac orange.

Adult.—Crown and sides of the head dark bluish green, gradually blending with the beautiful violet blue of the hind head and entire neck; back, rump, wings, and other plumage of a rich deep green; axillars, sides under the wings, and thighs

violet blue; smaller wing coverts violet; primaries brownish black, as are the other quills on their inner webs; tail and shafts black; the entire plumage very lustrous and silky in appearance; dispersed over the neck and on the sides of the body near the thighs are numerous short white piliform feathers which expand at the end in the form of a small brush; gular sac and bare space about the eye orange; feathers of the throat extend upon the lower part of the gular sac for about half its length, and terminate in a point; upper mandible blackish brown, lower dusky yellow; legs and feet black; iris greenish brown. *Female* brown.

Length, 28 inches; alar extent, 41; wing, 10.50; tail, 6.25; bill, 2; tarsus, 1.90; outer toe and claw, 3.75.

Hab.—Western coast of North America, California, Washington Territory.

The only specimen of this brilliant cormorant I obtained at the same place where Townsend got his in 1834, the extreme point of Cape Disappointment. While in that vicinity, in July, 1853, I watched for them particularly for several days, and though there were plenty of *P. Townsendi* in the river, I never saw one of these within the cape. But, sitting on the summit of that beautiful promontory one day, admiring a view unsurpassed by any in the world, I observed, three hundred feet below, in a little cove, sheltered from the breakers by some rocks, a bird fishing, which I knew must be the long-sought cormorant. I at once descended, and, obtaining a skiff with its side stove in, I went with the obliging light-house keeper and his assistant, who rowed round to the outside of this remarkable cape. The distance was only about 300 yards, and, until we suddenly turned the sharp outer point, the water was smooth as a mill-pond. Scarcely had we turned this point, when, suddenly, a flock of perhaps two hundred flew from the rocky ledges, and, circling round our boat, retired to a distant part of the cliffs. The swell was so violent here that it was impossible to take any aim, and after some useless shots, I returned. Next day we went round again, and by getting out on a ledge, before they all flew, I succeeded in shooting one. I found it to be a young bird, of course, incomplete in plumage at this season, and did not attempt to get any more. Townsend's specimen nearly cost him his own life and that of six men, so violently does the sea dash, usually, against these rocks. At the time of my visit it was unusually smooth. Afterwards, sailing out of the river, I observed numbers of them fishing some distance out. Many had the flanks marked by a large patch of white, probably distinguishing the adult birds. Others appeared different, and may have been the *P. perspicillatus*, a species common on the coast of California and also of Russian America. At the cape there was no sign of their having had nests nor places suitable for them. They prefer rocky islands, separated from the shore, which several kinds of water birds frequent, in incredible numbers, near the Straits of De Fuca and along the coast of California. As no such occur anywhere near the mouth of the Columbia, I had no opportunity of visiting these interesting nurseries. They probably only visit Cape Disappointment during their migrations.—C.

NOTE.—*A curious bird.*—Colonel Fitzhugh and Mr. Reed, of Bellingham bay, Washington Territory, informed me that during the winter of 1854-'55 a very strange "duck" was obtained by them on the bay near the coal mines.

According to the remembrances of the above named gentlemen it was of about the size of a small goose, or between that of a brant and a mallard. Its general color was of a *rich cream*; tail *dark*. The bill and feet, to the best of their recollections, resembled those of a *duck*. The forehead had a *red streak* on each side, and from the back of the head there were long *elongated, greenish-black feathers*, falling down gracefully to the right and left.

The bird was very tame, and allowed itself to be stoned for some time. It then rose and flew a short distance, when, again alighting on the *water*, it was approached and killed with a gun.

Never having seen such a bird before, and all the Indians who saw it having declared positively that it was new to them, the above named gentlemen had the bird skinned. The specimen, however, was unfortunately afterwards destroyed.

The fact that the bird *sat on the water*, and upon becoming alarmed retreated to it again at but a short distance, forbids the idea that it was a "crane;" besides, the fact that the long feet and legs of one of the *ardeinæ* would have at once been recognized. Perhaps the bird was an *albino* cormorant, yet its want of shyness or fear would seem to indicate the contrary.—S.

Family PROCELLARIDÆ. The Petrels.

Sub-Family DIOMEDEINÆ.—The Albatrosses.

DIOMEDEA BRACHYURA, Temminck.

The Short-Tailed Albatross.

Diomedea brachyura, TEMM. Pl. col. v, about 1828.—CASSIN, Ill. I, 1855, 289, pl. 1. Adult.—BAIRD and LAWRENCE, Gen. Rep. Birds, 822.

Diomedea nigripes, AUD. Orn. Biog. V, 1839, 327.—IB. Birds Am. VII, 1842, 198.—CASS. Ill. I, 1854, 210; pl. xxxv. (Young.)

SP. CH.—*Adult*.—Head and neck white, tinged with pale yellow; primaries, tips of secondaries and tertiaries, upper edge of the wing, and greater wing coverts brownish black; tail white, tipped with dark brown; back and entire under plumage pure white; bill pale reddish yellow; legs flesh color.

Length, 33 inches; alar extent, 84; wing, 20; tail, $5\frac{1}{2}$; bill, 5; tarsus, $3\frac{1}{2}$.

The young are ashy brown, lighter on the abdomen; for some distance around the base of the bill, and a space below the eye, grayish white; bill dusky; tarsi and feet black. Length, 30.50 inches; extent, 85 inches. Iris brown; bill black, with a purple tint; feet black.

Hab.—North Pacific; coasts of California and Oregon.

A dusky colored albatross, which proved to be the *Diomedea brachyura*, was obtained by me in the spring of 1856 from Captain Diggs, of the brig *Cyrus*, who had taken it off the coast of Oregon a few days before.

During a winter passage of fourteen days from the Straits of Juan de Fuca to San Francisco, although I saw many birds of the *genus*, I saw but one individual in *light* colored plumage, and that was near the mouth of the Columbia. All the birds I noticed seemed to belong to the species which Cassin has figured as the *D. nigripes* of Audubon. In a late number of Mr. Cassin's work he takes the ground that the *D. nigripes* is merely the *D. brachyura* in immature plumage. If this be the case I cannot understand why the *young* birds preponderate so greatly, as in my voyage from the Straits of Fuca I saw the single bird in light colored plumage spoken of above, and a little later, in my voyage from San Francisco to Hong Kong, China, I saw but one more in white plumage, as far west as the 145th degree of *east* longitude, and north of latitude 12° north, although in both passages *dark colored* birds were common. One of these, caught about four hundred miles southwest of San Francisco, had the white spot at the base of the bill very apparent, and many other birds of the species seen flying in our wake were similarly marked.

I fully concur in the remarks of Mr. Peale, quoted by Cassin, that the species *D. chlororhynchus* and *D. fusca* (*D. fuliginosa*, Gmelin) are confined to the south of the equator, and think, therefore, that they should both be stricken from the northwest fauna. It is true that specimens of both species brought home by Dr. Townsend are said to have been obtained from

off the coast of Oregon, but it is well known that Dr. Townsend's specimens were very carefully labelled, and I think it very likely that in these instances the specimens were obtained during his voyage to South America.

The specimen of albatross that I obtained four hundred miles southwest of San Francisco was caught in the usual way, by a hook baited with pork. In taking albatrosses in this manner the hook is not swallowed, but catches on the under side of the upper mandible, just behind its decurved point. The bird we caught became very "sea-sick" as soon as it was hauled on board, and very soon emptied the contents of its stomach upon the deck. Some of this ejected food looked much like broken up pieces of the cuttle fish, (squid.)

Albatrosses are generally seen more abundant in the wake of a vessel when the wind is *ahead*. This may be caused by the slow rate that at such times the vessel is progressing; but I think that the most likely explanation is that the wings are so shaped and placed that they act more like sails than wings, and are calculated to sail very "close to the wind." Added to the port and starboard tacks that the bird can make, as well as the ship it is in company with, it has the power to tack obliquely upwards and downwards in the air, which allows a *double zigzag progression*. The explanation why a bird can *fly* against the wind is not at all needed, but why it can *soar* against the wind, with apparently no exertion, and without (except at very long intervals) even attempting to gain speed by *flapping its wings*, (flying,) first puzzles the observer, and seems contrary to all our preconceived notions of movement, gravity, and force. When these birds are *going with the wind* they much more frequently flap their wings and fly like other feathered creatures.—S.

The short-tailed albatross is abundant along the coast of the Pacific, where, however, I have seen only the dark plumaged young, in various stages, but always marked chiefly with black. They often follow vessels, and are sure to appear soon after the dinner time of the steamships, to pick up the scraps thrown overboard.

Their flight is very rapid and graceful, performed apparently without effort, while their very narrow, long wings give them a peculiar appearance. They often alight and rest on the water, but can easily overtake the steamer going at twelve miles an hour, and sweep around it, beating in its wake in search of food.—C.

Family LARIDAE. The Gulls.

LARUS GLAUCESCENS, Lichtenstein.

The Glaucous-winged Gull.

"*Laroides glaucescens*, LICHT." BRUCH, Rev. Lar. in Cab. Jour. 1855, 281.

Larus glaucescens, (LICHT.) BAIRD & LAWRENCE, Gen. Rep. Birds, p. 842.

SP. CH — *Adult*.—Head and neck white, streaked with gray; under surface, rump, and tail pure white; back and wing, light pearl blue, (same shade as in *L. argentatus*; (the primaries are of the same color, but rather darker, with well defined white tips; on the first quill the white extends on the tip for about two inches, and is crossed by a bar of the same color as the primaries; iris white; bill yellow, with an orange red spot on the angle of the lower mandible; legs and feet flesh color.

Length, 23 to 26 inches; extent, 51.50 to 58; wing, $16\frac{1}{2}$; tail, $7\frac{1}{4}$; bill along ridge, $2\frac{3}{8}$, deep at base, 11-16, at angle, 12-16; tarsi, $2\frac{9}{16}$; middle toe and claw, $2\frac{5}{8}$. Female smallest.

Young mottled with grayish white and cinereous; the quills and tail bluish ash; bill black, in some specimens yellowish at base; legs and feet dusky flesh color; much smaller in first year than adult.

Hab —Northwest coast of North America.

The glaucous-winged gull is extremely common on Puget Sound during the winter season,

but probably retires to the north, for breeding purposes, in the spring. as after the middle of April they become quite scarce in that vicinity. During the cold months they are found in large flocks along the shores of the sound, and on the flats and marshes at the mouths of the small rivers and creeks in the neighborhood. At high water they are apt to extend their excursions a short distance above the mouths of these streams, flying singly or in small companies of three or four. They are at that season quite tame and unwary, flying very close to man, and allowing themselves to be readily killed with fowling pieces. When an individual is killed or wounded, the others, attracted by the sight, hover about their companion, and become an easy prey to the gunner. In this habit they resemble many other species of gull.

Most of the specimens I obtained were either in immature plumage, or else in peculiar winter dress. I have noticed from a short distance, among large flocks, certain individuals which varied greatly in the degrees of lightness of coloration, some being quite white-looking, while others had a very dark, dingy, smoked appearance.

They apparently subsist principally on such refuse matters as are washed up along the shores at high water. They are fond of resting on logs, boards, and bits of wood, which are at all times found drifting about on the waters of the sound. Floating on these they remain almost asleep for hours, until the tide having retreated, they leave their frail barks and congregate in vast numbers on their favorite feeding grounds.—S.

This gull, of which I obtained several specimens in various stages of plumage at Shoalwater bay, differs in no respect from the following in habits, as far as I observed, and constantly associates with it, at least in the colder weather. It seems to be a larger bird in each period of its growth.

NOTE.—*Larus chalconotus* (LICHT.) LAWRENCE, Gen. Rep. Birds, p. 843. During the coldest winter weather of January, 1855, a gull appeared at Shoalwater bay larger than the preceding, and with its mantle very pale gray, wings unmarked with black, bill and feet whitish. It remained only a short time, and was very shy. It fed along the shore, like the other species. It agreed with the *L. chalconotus* of Mr. Lawrence better than any other.—C.

LARUS OCCIDENTALIS, Audubon.

The Western Gull.

Larus occidentalis, AUD. Orn. Biog. V, 1839, 320.—AUD. Birds Am. VII, 1844, 161.—LAWRENCE & BAIRD, Gen. Rep. Birds, 845.

Laroides occidentalis, BRUCH, Cab. Jour. 1855, 282.—BON. Cons. Av. II, 1856, 219.

SP. CH.—*Adult*—The head, neck, rump, tail, and under plumage, pure white; the back and wings grayish blue, many shades darker than in *L. argentatus*; the first six primaries are black towards their ends, extending on the first for about half its length, and lessening on the others, until on the sixth it is reduced to a narrow sub-terminal bar; the tips of all are white; on the first the white is an inch and a half in extent, and crossed near the end with black; secondaries and tertiaries with broad white tips; iris gray; bill deep yellow, with a bright orange red spot on the angle of the lower mandible; legs and feet flesh color.

Young mottled with lead colored brown, grayish white, and brownish ash, lighter on the lower parts; primaries blackish brown; bill brownish black, dull yellow at base; legs and feet brownish flesh color; eye dark brown.

Length, 21.50 to 24 inches; extent, 52 to 55; wing, 15.25 to 17; tail, 7; bill, $2\frac{1}{2}$; depth at angle, $\frac{7}{8}$; tarsus, $2\frac{7}{8}$. Female smallest.

Hab.—Northwest coast of North America.

The *western gull* is very abundant along the whole of the coast that it inhabits, as far south as the Peninsula of California, where I noticed them for the last time on my voyage down the

coast in December, 1855. On the numerous small islands near the Mexican boundary they were very abundant, and, as many winter even at Puget Sound, it is probable that their winter migration extends no further south than here. And it is very likely that they reside about these islands during summer, as they are known to breed on the islands off San Francisco bay, which can differ very little in climate from these, the prevailing sea breeze causing a very uniform temperature along the whole western coast of the United States.

At Shoalwater bay I had an opportunity of observing the habits of this bird at all seasons, though there were unfortunately none of its breeding places to which I had access. It is the only species constantly to be seen there, and is abundant, though not occurring in such great flocks as some other species do at certain seasons. In flight, appearance, and cries they very closely resemble the silvery gull. Their flight is slow, laborious, and performed by flapping, except in storms and violent blows, when they are fond of soaring to a great height, circling round each other like eagles, without a movement of their wings, and often wandering far inland—the sure forerunner of a severe storm.

They feed commonly during low tide, both at night and day. No sooner does it begin to ebb than hundreds of gulls, which have been dozing for hours on the beach, or, if the day is calm, floating quietly on the water at a little distance, join the long train of screaming godwits, sandpipers, and fish-crows, and fly to the sand-banks, river shores, and muscle-beds, there to feast until the returning tide drives them away. If one discovers a dead fish or other dainty food, his loud screams, audible for miles, soon summon a crowd of associates, like the vultures, to the carcass. Then all is confusion; one flying off with the fish, others pursuing, screaming, and striking each other, until they have each had a pull at it, and none is left. The same thing occurs if one finds a clam, (of which many species are washed out and left on the surface by the tide.) As they cannot break the shells with their bill, the successful bird will fly towards some well known hard sand-bank, and rising by circling flight fifty feet or more, drops the shell. If not broken by the first fall he repeats it, ascending higher each time, or flying off to a harder place. As it falls they dive through the air after it, in short oblique turns, quite different from their bold headlong plunge after fish in the water. Crabs, sea-worms, dead rats, and probably any animal food, is eaten by the voracious gull, which may be compared among sea-birds to the raven on land, which feeds also in the same places.

If the tide has been a very low one, (as happens every alternate fortnight along the western coast,) the gulls gorge themselves with food before the return of flood tide, and then sit listlessly until it floats them off, probably often sound asleep. But they are very difficult to approach within shot even then, though they will frequently fly very near a person who is not pursuing them, screaming, and observing him with much curiosity. If not satisfied, they watch along the edge of the water for the shoals of small sculpins, sticklebacks, &c., that come over the shoals with the tide, and, wading in, feed on them as they approach; or, if shoals of herring are entering the bay, they sometimes fly over and dive after them. This, however, is too laborious a mode for this lazy bird when it can get enough by easier means. About San Francisco they have taken advantage of man's presence, and great numbers of these and ring-billed gulls feed on the refuse of the markets and sewers, fearlessly resting on the wharves, where they are not molested.

Though so unscrupulous in feeding, this gull is exceedingly neat, and spends hours in cleaning and pluming its beautiful feathers, generally sitting in the water and washing itself at the same time. No sea bird is more beautiful or graceful in its motions than this, as seen in large flocks

pursuing the steamers along the coast, within sight of land, easily keeping up with the speed of ten miles an hour, though having nothing like the power of wing of the albatross that generally accompanies them at these times.

In March these gulls are commonly seen in pairs, the female only distinguishable by its somewhat less size. They are said to lay on the islands off Cape Classet, and perhaps do also on some within the Straits of De Fuca. They are still found during summer a long distance from these places, but whether these are barren birds, or resort for food to such a distance, I do not know.

In October, 1853, I saw a few large gulls 400 miles up the Columbia river, east of the Cascade mountains, but could not ascertain whether they were of this species. I believe, however, that they fly up that river at least 100 miles from its mouth.

I could distinguish no difference in habits between the dark and light blue specimens, which have the same peculiar bill and dimensions.—C.

LARUS CALIFORNICUS, Lawrence.

The California Gull.

Larus californicus, LAWRE. AND. LYN. N. H. N. Y. VI, 1854, 79.—BAIRD & LAWRENCE, Gen. Rep. Birds, 846.

Laroides californicus, BON. CONS. AV. II, 1856, 220.

SP. CH.—*Adult*: The head, neck, under plumage, rump, and tail, pure white; back and wings pearl blue, darker than in *L. argentatus*, but not so dark as in *L. occidentalis*; the six outer primaries are marked with black towards their ends, extending on the first for about two-thirds its length, and becoming less on the others, until on the sixth it consists only of a sub-terminal bar; the tips of all are white; on the exterior quill the white extends about two inches, and is crossed near the end by a black bar; the secondaries and tertiaries terminate with white; iris hazel; bill yellow; basal part of the upper mandible greenish gray for two-thirds its length; a blackish band crosses both mandibles near their ends; it is darker in color on the lower mandible, where it is bordered with orange; tarsus and feet flesh color.

Length, 20 to 22.50 inches; extent, 49 to 55; wing, 15.25 to 16; tail, 7; bill, 2; depth at angle, 10.16; tarsus, $2\frac{3}{8}$; middle toe and nail, $2\frac{1}{4}$; female smallest.

Hab.—Pacific coast.

The California gull is also an abundant species along the western coast, excepting in summer, when they appear to retire beyond the limits of the Territory. In winter they remain in small numbers on the coast, and probably for some distance up the Columbia as long as it remains unfrozen. In habits they much resemble the western gulls, but seem more inclined to dive for fish, though they also feed in the edge of the water during rising tide. I have never seen them break shell-fish as the other does. I did not see any of them following the vessels out at sea, and they appear to be confined to bays and rivers.

The following are the colors of parts which change in drying: Iris dark brown, bronzed; bill greenish yellow, with a black band around angle, and *sometimes* an orange red patch beneath; inside of mouth orange red; edge of lids dark dull red; feet greenish white, in the young grayish.—C.

LARUS DELAWARENSIS, Ord.

The Ring-billed Gull.

Larus delawarensis, ORD, Guth. Geog. 2d Am. ed. II, 1815, 319.—BAIRD & LAWRENCE, Gen. Rep. Birds, 846.

Larus brachyrhynchus, RICH. & SW. F. Bor. Am. II, 1831, 422, (not of Gould.)

Larus zonorhynchus, RICH. & SW. F. B. Am. II, 1831, 422.—NUTT. Man. II, 1834, 300.—AUD. Birds Am. VII, 1844, 152; pl. cccclvi.—BON. CONS. AV. II, 1856, 224.

SP. CH.—*Adult*: The head, neck, under parts and tail are pure white; back and wings very light pearl blue; first and second primaries black for two-thirds of their length towards the end, the three next quills have the black much less in

extent, and on the sixth it is reduced to a sub-terminal bar; the first quill is black at the end, above which is a broad white band; the second quill is black to the tip, with a white spot on the inner web an inch and a half from the end; the other primaries tipped with white; secondaries and tertiaries ending in white; iris yellow; bill crossed near the end with a blackish brown band, between which and the base it is greenish yellow; the tip is yellow; tarsi and feet greenish yellow.

Length, about 20 inches; wing, 15; tail, 6; bill, $1\frac{5}{8}$; depth at angle, $\frac{1}{2}$; tarsus, $2\frac{1}{8}$.

Young: On the upper plumage mottled with blackish brown and gray; beneath grayish white, with light brown spots; primaries black; tail white, with a sub-terminal black band; bill black, with the base yellow.

Hab.—Arctic America; Texas to Labrador; western rivers; northwest coast.

The ring-billed gull is not uncommon on Puget Sound, where I obtained several specimens. It has been my rule, as far as possible, in this report, to confine myself, in treating of the various species of birds, to those which have been *collected* by me; and, after careful comparison with others in the Smithsonian collection, have been found strictly entitled (so far as yet known) to the specific name assigned to them. In the present instance, however, I feel justified in departing from the rule, as, although my own specimens were lost before reaching Washington, I, nevertheless, feel sufficiently certain that they were identical with the old *Larus zonorhynchus*, the present species. This is verified by the presence of a specimen in the Smithsonian collection procured by Dr. Kennerly on Puget Sound, and also by a comparison of the notes taken by me on a couple of skins which agree, with the exception of the toothed bill, with the following description by Mr. Ord of the species which is quoted by Mr. Lawrence in the General Report: "Length, $19\frac{1}{2}$ inches; extent, 46; upper mandible with four indentations or blunt teeth; lower with three; corner of mouth and eyelids, bright vermilion; head, neck, tail, and beneath, pure white; wings, back, and scapulars, blue ash; weight, 19 ounces."

My own specimen, (marked 478,) an adult, measured almost the same as the one described by Mr. Ord, being 19 inches in length and 46.50 in extent. The legs and feet were of a gamboge yellow, with a slight greenish tinge; bill of the same color, with a black zone near the tip; *margin of eyelids vermilion; angle of mouth bright reddish orange*. Another agreed in every respect except in dimensions, which were larger.

This species seems to be subject to great changes in color of plumage, feet, and bill, at different ages. Its habits are not different on Puget Sound from those of its brethren on the eastern coast, and have been so well described by Nuttall and others that I can add scarcely anything. Near Fort Steilacoom they are very abundant during the cooler months, at which season they are very common on the marshes and flats at the mouths of the different rivers emptying into the sound. When an individual is wounded, his comrades, like other gulls, hover over and circle around the victim as if impelled by motives of curiosity or compassion. Frequently at this time the others can be readily brought down by the same gunner with his undischarged barrels, but the occasion must be quickly seized because the sympathizing birds, which at first are bewitched, as it were, by the accident to their companion, soon lose the charm, and, becoming more wary, enlarge their circles, and, ascending higher and higher, soon place themselves out of shot range.—S.

LARUS SUCKLEYI, Lawrence.

Suckley's Gull.

Larus suckleyi, LAWRE. Ann. Lyc. N. H. N. Y. VI, 1858, 264.—BAIRD & LAWRENCE, Gen. Rep. Birds, 847.

SP. CH.—*Adult*: Head, neck, under plumage and tail, pure white; back and wings clear pearl blue; ends of the primaries black, occupying about half the length of the first and decreasing to the seventh, on which it consists only of a sub-terminal

spot; the first primary has a white spot over both webs an inch and a half in extent inside the tip; the second has a similar mark of white, but less in extent; the tips of the first and second primaries are black, but of all the others white; the secondaries and tertiaries largely marked with white at their ends; bill dusky yellowish green, except on the ridge of the upper mandible, forward of the nostrils, and on the angle of the lower mandible, which parts are orange yellow; tips of both mandibles pale yellow; legs and feet greenish yellow.

Length, 16 to 17.50 inches; extent, 41.50 to 44.50; wing, 12.75 to 14; tail, $5\frac{1}{2}$; bill, 1.5-1.6; tarsi, $1\frac{1}{8}$.

Young: Mottled with grayish white and dark ash; wings and tail dark brown, the latter ashy white at the base and tip; bill flesh color for half its length from the base, terminating with black; legs and feet flesh color; iris brown.

Hab —Pacific coast; Puget Sound.

The gull to which Mr. Lawrence has, in a complimentary manner, applied my name is quite abundant during the winter season in the bays and inlets of Puget Sound. In habits it much resembles the *L. glaucescens* and, in certain conditions of plumage, (in its general appearance,) it looks very much like a miniature of that species. They are also found much in company with each other. I saw a gull, apparently of this species, attempting to break a clam by carrying it high in the air and then dropping it, in the same manner as is the practice of fish crows and several of the other gulls.

The greater number retire to the north on the approach of warm weather, but again return to the sound about the 1st of November. They are fond of swimming about on the surface of the water, and, when desirous of so doing, can swim very fast. They generally merely rest dozingly, or lazily paddle about during their period of quiet; as the tide retreats, however, they join vast numbers of other gulls, fish crows, &c., and repair to the flats at the mouths of the various rivers which empty into the sound, where they engage themselves in search for small fish, crabs, mollusks, &c., and for any refuse offal which may be thrown up by the waves. Their voice is a rather harsh, grating scream of not much power.—S.

In spring and fall, for a few days of May and October, a small species of gull passed through Shoalwater bay in flocks, and early in the morning would seek some quiet, sheltered cove to feed, diving for fish rapidly while fluttering over the shoals, and rarely alighting on the water except to rest. They kept up a continual chattering while thus engaged, and on the approach of a boat would move off together for another place. Their flight was more rapid and easy than that of the large kinds. The adult was white, with a pale gray mantle. I only obtained one young specimen.—C.

BLASIPUS HEERMANNI, (Cassin,) Bon.

The White-headed Gull.

Larus heermanni, CASS. Proc. Acad. N. Sc. Phil. VI, 1852, 187.—*ib.* Ill. I, 1853, 28; pl. v.

Larus Belcheri, VIGORS, Zool. Journ, IV, 1829, 358.—*ib.* Zool. Blossom, 1834, 39.

Blasipus heermanni, BON. Cons. Av. II, 1856, 211.—BAIRD & LAWRENCE, Gen. Rep. Birds, 848.

? *Larus fuliginosus*, GOULD, Zool. Beagle, Birds, p. 141.

SP. CH.—*Adult*: Bill red, both mandibles tipped with black; feet and legs dark; head white, which color gradually blends into an ashy lead color, enveloping the entire body above and below, darker on the back and wings and paler on the abdomen. Secondary quills tipped with white, forming an oblique bar when the wings are folded. Superior coverts of the tail very pale cinereous, nearly white. Quills and tail feathers brownish black, all of the latter narrowly tipped with white. Shafts of the two first primaries white on the inferior surface of the wing.

Length, 18.50 to 21 inches; wing, 13.25 to 14; tail, $5\frac{1}{2}$; bill from angle to tip of upper mandible, $2\frac{1}{4}$ inches.

Young: Smaller; entire plumage lead color; darker on the head and paler on the under surface of the body; quills and tail feathers brownish black, the latter narrowly tipped with white; rump white. Iris brownish gray.

Hab.—Coast of California.

Two gulls, supposed by me to be specimens of *L. belcheri*, Vigors, but retained under the synonym of *heermanni*, by Mr. Lawrence, in the General Report, were obtained in the Straits of Fuca, near Whidby's island, Washington Territory, in August, 1856. At that season they are quite common about the lower part of Puget Sound, but they retire southward before cold weather.

This species, unlike the ring-billed and many other gulls, does not seem to be fond of feeding on the shores and bare flats, but is almost always (in that vicinity at least) found on the *kelp beds* floating in the deep water some distance from shore. Whether they are attracted to these kelp beds by the hopes of finding small shell-fish in the upturned and net-like roots of such plants as, detached from their fastenings on the bottom, have become entangled together and with others *in situ*, or because these *floating islands* afford a convenient resting place where they can rest to a great extent secure from their enemies of the land, I cannot say; but presume that the presence of a supply of food must be a great inducement. It was from one of these collections of kelp that I shot my two specimens. While being skinned they emitted a very rank disagreeable odor, much stronger and more unpleasant than that of the ring-billed species. Both my gulls had bright red bills.—S.

Early in September large flocks of this gull begin to enter Shoalwater bay with the terns and pelicans. They remain about two months before retiring southward fishing for the herrings which come at that season. Though quite rapid in flight, and well able to supply themselves with food, they have a curious habit of "sponging" on the pelicans and large gulls. Often a long train of pelicans is seen, as the tide is rising, slowly wandering round the bay, each one attended by one or two of these gulls, which are usually some distance behind.

Whenever a pelican awkwardly plunges into the water and emerges with its enormous scoop-net full of fish, its parasites are sure to be ready and fearlessly seize the fish from its very jaws, the stupid bird never resenting the insult, or appearing to take the least notice of the little pilferer, which it could easily rid itself of by one blow, or even swallow them alive. The large gulls being poorer fishers, and perhaps less easily robbed, are not so often honored by the company of this uninvited guest, while the terns are entirely too quick to be made useful by it. When no pelicans are present these gulls will fish for themselves, and often accompany the western gull along the edge of the rising tide, wading in after small fish.

In July, 1855, I observed for several days, from the top of Cape Disappointment, flocks of gulls flying northward, together with pelicans, at a short distance from the beach. A few entered the mouth of the Columbia one day, and I obtained one. It seemed to be of this species, having the red bills and same proportions, but was smaller, and with a white head, tail, and rump, blotched with gray, resembling Heermann's gull in colors, though larger. None of these were seen in the flocks in September. I agree with Mr. Lawrence and Dr. Suckley in considering this the *L. belcheri* of Vigors, and our specimens agree with his measurements, excepting the wing. Mr. Cassin's measurements may have been from shrunken skins, though only an inch less in length than the specimen last mentioned.—C.

CHROICOCEPHALUS PHILADELPHIA, (Ord,) Lawrence.

Bonaparte's Gull.

Sterna philadelphia, ORD, Guthrie's Geog. 2d Am. ed II, 1815, 319.

Larus capistratus, BONAP. Syn. 1828, No. 293.

Larus bonapartei, RICH & SW. F. B. A. II, 1831, 425; pl. lxxii.—NUTT. Man. II, 1834, 294.—AUD. Birds Am. VII, 1844, 131; pl. cccclii.

Chroicocephalus philadelphia, BAIRD & LAWRENCE, Gen. Rep. Birds, 855.

SP. CH.—Adult: Head and upper part of neck grayish black, this color extending rather lower on the throat than on the neck behind; lower part of neck, under plumage, rump, and tail, white; back and wings clear bluish gray; first primary black on the outer web; inner web of the first primary, both webs of the second, and the outer web of the third, white; the inner web of the third and all the other primaries are of the same color as the back; the six outer primaries have their ends black for the extent of about an inch on the central ones, but less on the first and sixth, they are all slightly tipped with white; shoulders, anterior borders of the wings, and outer webs of the primary coverts, white; bill deep black; inside of mouth carmine; iris hazel; legs and feet orange, with a reddish tinge.

Length, $14\frac{1}{2}$ inches; wing, $10\frac{1}{2}$; tail, $4\frac{1}{4}$; bill, $1\frac{1}{8}$; tarsus, $1\frac{5}{16}$.

Hab.—Texas to Nova Scotia, Mississippi river, fur countries, Pacific coast of North America.

The beautiful little Bonaparte's gull is extremely common on Puget Sound, near Fort Steilacoom, and seems to be a constant resident at all seasons. It, like several other species, is found, at low tide, abundant on the flats and "tide prairies" at the river mouths.

It is the only gull commonly eaten by the Nisqually Indians. I tried one broiled, finding it equal to many birds well recognized as edible, as, for example, the larger rails.

I obtained birds in July, which I supposed were the young of the year. The species is sufficiently numerous during the summer to warrant the belief that it breeds in the vicinity. The country, at the time I spent my last summer there, was in such a disturbed condition, owing to the hostile attitude of the Indians, that my excursions and observations were much interfered with.—S.

NOTE.—The hooded gull, or *C. cucullatus* of LICHTENSTEIN, was obtained by me at Panama, and probably extends to a considerable distance north, along the coast. It is a little smaller than the *C. philadelphia* and has the bill *deep carmine*, besides other differences.—S.

In May and in October a *black-headed* species of gull migrates along the western coast in large flocks. They closely resemble the *Larus Suckleyi* in habits, feeding entirely by diving among the shoals of small fish. Being constantly on the wing, and very shy, I could not distinguish which of the five black-headed species described they were, but probably the *C. philadelphia*.—C.

RISSA SEPTENTRIONALIS, Lawrence.

The North Pacific Kittiwake; Turner's Kittiwake.

Rissa septentrionalis, LAWRE. ANN. LYC. N. HIST. N. Y. VI, 1858, 265.—BAIRD & LAWRENCE, Gen. Rep. Birds, 854.

SP. CH.—Adult: Head, neck, under surface, and tail, pure white. Back and wings light pearl blue; first primary black for about half its length from the end; a white spot one and a half inches in length crosses both webs near the end, which is black; second primary black for about one-third its length; also with a white spot (but smaller) inside the black tip; the next five primaries are black at their ends, with white tips; the black decreases inwards, existing as a spot only on the seventh; basal part of the primaries bluish ash, becoming white where it joins the black ends, except on the first and second; secondaries and tertiaries ending with white; bill dusky green at the base for two-thirds its length; remainder yellow, which deepens to orange on the ridge of the upper mandible and angle of the lower; legs and feet yellowish green. Length, $17\frac{1}{4}$ inches; wing, $13\frac{1}{2}$; tail, $5\frac{3}{4}$; bill, $1\frac{1}{8}$; tarsus, $1\frac{1}{2}$.

Hab.—Pacific coast of North America; Puget Sound.

The two specimens upon which Mr. Lawrence founded this species were given to me by Dr. Thomas J. Turner, of the United States navy, who had obtained them at Bellingham bay, a harbor just north of Puget Sound. Dr. Turner obliged me on many occasions by his kindness in securing me specimens of various kinds, and made his friendship the more pleasant by the interest which he took in furthering, as far as was in his power, the procurement of data tending to elucidate the hitherto obscure natural history of the northwest coast.—S.

? *Sterna regia*, GAMBEL ; LAWRENCE, Gen. Rep. Birds, p. 859.

I several times, in May and September, saw a few terns flying over Shoalwater bay, which were probably of this species, though others might have sometimes been with them, for description of which I must refer to the general report.—C.

Family COLYMBIDAE. The Divers.

Sub-Family COLYMBINAE. The Loons.

COLYMBUS TORQUATUS, Brünnich.

The Great Northern Diver ; The Loon.

Colymbus torquatus, BRUNN. ORN. BOR. 1764, 134.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 888.

Colymbus glacialis, LINN. Syst. Nat. I, 1766, 221.—FORSTER, Phil. Trans. LXII, 1772, 383.—WILS. Am. ORN. IX, 84, 1824, pl. lxxiv.—BONAP. Syn. 1828, No. 368.—RICH & SW. F. B. Am. II, 1831, 474.—NUTT. Man. II, 1834, 513.—AUD. ORN. BIOG. IV, 1838, 43; pl. 306.—IB. Birds, Am. VII, 1844, 282; pl. cccclxxvi

Colymbus immer, LINN. Syst. Nat. I, 1766, 222. (Young of year.)

SP. CH.—Bill compressed, strong and tapering, outline of upper mandible nearly straight, very slightly curved; the lower mandible has a groove underneath, running from the junction of the crura towards the point; the tail consists of twenty feathers.

Adult.—The head and neck are dark bluish green, the upper part and sides of the head glossed with purple; there is a small transverse mark on the throat, composed of white feathers of a quill-like form, distinct from each other and placed longitudinally on each side of the neck; lower down are larger patches of white, of the same peculiar form, and running in the same direction; these almost meet behind, and in front are about one inch apart, the effect of these pure white feathers, relieved by the dark color of the neck, is very beautiful; the upper plumage and wing coverts are deep glossy black, beautifully marked with pure white spots placed in regular transverse rows, slightly curving downwards; these spots, on the upper part of the back, are small and nearly round, but as they descend lower on the back increase in size and become quadrangular in form, being largest on the scapularies; on the lower part of the back, upper tail coverts and sides (which are black) the spots are small and round; the sides of the neck, near the shoulder, are beautifully lineated with black and white; the primaries, secondaries and tail brownish black; the under surface glossy white, with a narrow band of dusky feathers crossing the lower part of the abdomen, and marked with small white spots; lower tail coverts blackish brown, tipped with white; bill black; iris deep bright red; tarsi and feet grayish blue externally, tinged on the inside with pale yellowish red; webs brownish black; claws black.

Length, 31 inches; wing, 14; tarsus, $3\frac{1}{4}$; bill, 3; height at base, 1.

Young.—The plumage above is grayish black, the feathers of the back margined with grayish white, the under plumage pure white, bill yellowish, with the ridge of the upper mandible dusky.

Hab.—Very generally distributed; it is abundant on the Atlantic coast, in the lakes of the interior and the fur countries, Pacific coast, and New Mexico.

This loon I found in winter common near Fort Steilacoom, both on the salt waters of the sound and upon the small fresh water lakes of the vicinity. On the latter a few remain during the breeding season. They are possessed of all the cunning and quickness which so characterizes the species elsewhere. In winter they are quite fat and are much sought after by the Indians, who are very fond of eating them, and who shoot them in the following manner: A single Indian, in a small ducking canoe, sits screened by a bunch of evergreen branches placed in the bow. Seeing a loon swimming in the water he paddles stealthily towards it, and having approached, say, within very long gunshot, waits until the bird dives. He then paddles with all his might in the direction in which the bird went under; but as soon as the latter reappears on the surface, which, if previously undisturbed, it is apt to do at a *short* distance, the wily hunter stops paddling, and if within easy range fires at the unsuspecting bird, which is generally killed, or, at least, severely wounded at the first fire. Should the bird, however, be still out

of range he waits until it again dives, when he proceeds as before, each dive bringing him nearer and nearer the victim.

I have been told by western men that loons, when wounded, frequently dive to the bottom, where, seizing hold of *eel grass*, or some other aquatic plant, they remain submerged until it is presumed that all danger is over, or until actual necessity drives them to the surface for air. Some, it is said, becoming entangled among the weeds, are drowned.

The distance that this bird will pass under water, when endeavoring to escape by diving, is wonderful. I think that I have certainly seen them, after diving, reappear at a distance of nearly half a mile. They use their wings while under water, *flying*, in reality, through the aqueous element.—S.

The great loons are abundant during winter in the bays along the coast, and in summer disperse in pairs to the small lakes of the interior, especially near Puget Sound, to breed.—C.

COLYMBUS PACIFICUS, Lawrence.

The Pacific Diver.

Colymbus pacificus, LAWRENCE; BAIRD & LAWRENCE, Gen. Rep. Birds, p. 889.

SP. CH.—*Young*: Head above and hind part of neck dark bluish gray; back, wing coverts, and scapulars blackish brown, margined with grayish white, most conspicuous on the latter; primaries black; secondaries dark brown, with the ends of their inner webs margined with white; under lining of wings and axillars white; tail blackish brown, tipped with white; under plumage white; sides dark brown, the feathers with gray edgings; a dusky band on the lower part of the abdomen, at the base of the tail; lower tail coverts white, with brownish ends; the upper mandible is dark brown above, sides yellowish at the base for half its length, bluish white at the end; under mandible, with the basal half, yellow, the remaining half bluish white; tarsi and feet are externally reddish brown, (in the dried specimens,) yellowish internally; claws yellow, with dusky margins.

Length of one specimen, (No. 9924,) from Fort Steilacoom, 25 inches; wing, $11\frac{1}{4}$; tail, 2; bill, $2\frac{3}{8}$; tarsus, $2\frac{3}{4}$.

No. 9921 measures in length, 24 inches; wing, $10\frac{1}{4}$; tail, 2; bill, 2; tarsus, $2\frac{1}{2}$; outer toe, $3\frac{1}{4}$.

Hab.—Coast of California; Puget Sound.

The Pacific diver is found rather abundantly on Puget Sound in winter. In habits it resembles greatly the preceding species, for immature individuals of which I mistook it. It usually retires to the north on the approach of warm weather. A few may remain on the inland lakes of the Territory.—S.

COLYMBUS SEPTENTRIONALIS, Linn.

The Red-throated Diver.

Colymbus septentrionalis, LINN, S. N. I, 1766, 220.—BONAP. Syn. 1828, 370.—RICH. and SW. F. B. A. II, 1831, 476.—NUTT. Man. II, 1834, 519.—AUD. Orn. Biog. III, 1838, 20: V, 1839, 625.—IB. Birds Am. VII, 1844, 299; pl. cccclxxviii.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 890.

SP. CH.—*Adult*: Front, sides of the head, upper part of the throat, and sides of the neck, clear bluish gray; upper part of the head of the same color intermixed with blackish spots; the hind neck streaked longitudinally with white on a greenish black ground, the white feathers being raised above the others. On the fore part of the neck is a large longitudinal patch of deep reddish brown. Upper plumage brownish black, slightly tinged with green, and on the upper part of the back and lower part and sides of the neck streaked and mottled with white. Wings and tail brownish black; under plumage pure white, with a band across the hind part of the abdomen, and the lower tail coverts brownish gray; bill bluish black; iris bright red; tarsi and feet brownish black externally, on the inside pale flesh color; claws yellowish at the base, dusky at the end.

Length, 27 inches; wing, $11\frac{1}{2}$; tail, $2\frac{1}{2}$; bill, $2\frac{1}{4}$; tarsus, $2\frac{3}{4}$.

Young: Upper part of the head and hind neck dull gray, streaked with grayish white; back and wings blackish gray, profusely marked with oval-shaped white spots, there being two on each feather, smallest on the upper part of the back and

largest on the tertiaries; quill feathers and tail blackish brown, the latter edged with white; sides of the neck white, speckled minutely with gray; under plumage silky white, crossed on the lower part of the abdomen by a dusky band; bill bluish gray, dusky on the ridge and flesh colored at the base. Length, 20 inches; extent, 30; iris blood red.

Hab --During the winter as far south as Maryland; inhabits as far north as the Arctic seas; found also on the Pacific coast.

On the 20th of March, 1855, I obtained at Fort Dalles, Oregon, an immature bird, which seemed to be of this species. Another was procured by Mr. Gibbs at Port Townsend, Puget Sound.

From the joint observations of Dr. Cooper and myself, it seems probable that the different species of loons, as well as the grebes, are several years in acquiring their perfect adult plumage.

Another individual which I obtained at New Dungeness, Straits of Fuca, I had an excellent opportunity of examining at a time it was attempting to escape from a shallow lagoon to the open water of the straits by swimming through the narrow outlet. Although slightly wounded, it moved so rapidly that I was obliged to run as fast as I could to keep up with it. At the same time, as the water was clear and shallow, I was able to watch its motions distinctly. It had the head and neck extended nearly perfectly straight, the bill acting as a "cut-water," and, in addition to the ordinary propulsion by the feet, used the wings exactly as if flying. Indeed, the bird was flying through water instead of air. This habit is probably common to all the *Colymbidae*.—S.

Sub-Family PODICIPINAE.—The Grebes.

PODICEPS CRISTATUS, (Linn.) Lath.

Grested Grebe.

Colymbus cristatus, LINN. Syst. Nat. I, 1766, 222.

Podiceps cristatus, LATH. Ind. Orn. 1790.—RICH. & SW. F. B. A. II, 1831, 410.—NUTT. Man. II, 1834, 250.—AUD. Orn. Biog. III, 1835, 595; pl. 292.—IB. Birds Am. VII, 1844, 308; pl. cccclxxix.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 893, var. ? *cooperi*, 894.

SP. CH.—*Adult*: Front, upper part of the head, and long occipital tufts dark umber brown, the base of the tufts brownish red; the ruff is bright brownish red on the upper portion immediately under the tufts and anteriorly, on the hind part brownish black; upper plumage dark umber brown; humeral feathers white; primaries umber brown; secondaries mostly white; throat and sides of the head white; fore part and sides of the neck adjoining the ruff brownish red; under plumage silvery white; sides dusky, tinged with reddish brown; bill blackish brown, tinged with carmine; bare loreal space dusky green; iris bright carmine; tarsi and feet greenish black externally, greenish yellow internally; webs grayish blue.

Length, 19 to 20.50 inches; extent, 33 to 34; wing, $7\frac{3}{4}$; bill, $2\frac{1}{8}$; tarsus, $2\frac{1}{2}$. Female smallest.

Young: Upper part of head dark brown; hind neck brownish gray; back and wings brownish black; humeral feathers white; primaries dark umber brown on the outer webs, paler on the inner; lower parts silvery white, sides brown; upper mandible brownish black, pale at the end and yellow on the sides at the base; lower mandible yellow, with the sides dusky; feet black, greenish yellow on inner side; iris brown.

Hab.—Atlantic States from Nova Scotia southward; Texas in winter; fur countries, Pacific side of the continent; Washington Territory.

In the notes on *P. occidentalis* I have noticed all I remarked of this species. On the only occasion when I saw them they were with the others, which they so closely resembled in appearance that at a distance they were scarcely distinguishable. I could see also no difference in their cries or habits at that season, and never saw them at any other time or place. Although killed late in March, both species were in the immature plumage, as were the many specimens of the three species I obtained in the Territory at almost all seasons, except summer, when they all disappear.—C.

PODICEPS OCCIDENTALIS, Lawrence.

The Western Grebe.

Podiceps occidentalis, (LAWRENCE,) BAIRD & LAWRENCE, Gen. Rep. Birds, p. 894.

SP. CH.—*Winter*: Upper part of the head and nape fuliginous black; back and wing coverts grayish black, the feathers margined with gray; primaries light ashy brown, darker at the end and white at base; secondaries white, marked with ash on the outer webs; in some specimens the middle secondaries are pure white; space between the bill and the eye gray; throat, sides of the neck, and entire under plumage silvery white; sides marked with grayish black; bill dusky, appearing nearly black in the dried specimens, except on the cutting edges and at the end, where it is yellow; iris, orange red; tarsi and feet, blackish olive externally, and internally greenish yellow. Length, 24 to 28 inches; extent, 34.50 to 36; wing, from 7.50 to 8.50; bill, 3; tarsus, 3. Female smallest. A large individual in Dr. Suckley's collection had the tarsus 3.50 inches; bill from gape, 3.75.

Hab.—Pacific coast, from Washington Territory to California.

This grebe I observed during winter on Shoalwater bay, and in March at Puget Sound, but have never seen one at any time between May and November, when they return southward. While at anchor in the sound, one afternoon about sunset, large numbers of this and the preceding species came near the boat, and I succeeded in killing four, three of which I obtained. At a little distance the two species are difficult to distinguish, and also very hard to shoot, unless fired at when they are looking another way. They were most active and numerous towards sunset, when their loud bleating resounded everywhere around us. The *P. californicus* was abundant on the sound at the same time. Both species are frequently washed up dead after storms. They all fly strongly and rapidly, though rising from the water with difficulty. The much longer neck of this species will alone distinguish it from *P. cristatus*, which it so much resembles in coloring and size. After skinning them I measured their necks, including all the cervical vertebrae, and found the neck of this species to be $12\frac{1}{2}$ inches long, four inches more than that of the other. It is scarcely long and slender enough, as represented in the figure.—C.

The western grebe is a regular visitor at Puget Sound during the cold months, and is usually quite a common winter resident on its bays and inlets. In the fall of 1856 I obtained numerous specimens in the vicinity of Fort Steilacoom, finding them most abundant at the mouths of the small rivers and creeks emptying into the sound. These latter they ascend at flood-tide, swimming up to the fresh water, where they remain diving and fishing until the tide having changed and the water falling, they retreat gradually back to the deeper waters of the sound. They are generally found in couples, even late in the fall. At that season they are without the elongated feathers of the head, characteristic of other species during the spring and early summer. It is called by the Nisqually Indians *swah-teese*, and is said by them to have formerly been an Indian man—the elder brother of the *Podiceps cornutus*, a very disreputable character, and the wife of the great blue heron.

A specimen killed near Fort Steilacoom, October 8, 1856, measured as follows: length, 24 inches; extent, 33; wing, 7.87; from angle of eye to tip of bill, 2.90; tarsi, externally dusky olive, internally pale dusky greenish yellow; iris, orange; bill, dusky above; pale on the sides and tip.—S.

PODICEPS CORNUTUS, (Gm.) Lath.

The Horned Grebe.

Colymbus cornutus, Gm. Syst. Nat. I, 1788, 591.

Podiceps cornutus, LATH. Ind. Orn. II, 1790, 783.—BON. Syn. 1828, No. 366.—RICH. & SW. F. B. A. II, 1831, 411.—NUTT. Man. II, 1834, 254.—AUD. Orn. Biog. III, 1835, 429: V, 1839, 623.—IB. Birds Am. VII, 1844, 316; pl. cccclxxxi.—BAIRD & LAWRENCE, Gen. Rep. Birds, p. 895.

SP. CH.—*Adult*: Upper part of the head, cheeks, throat, and ruff, glossy black; a broad band running from the bill over the eyes, and the elongated occipital tufts behind them yellowish red, deepest in color adjoining the bill; upper surface brownish black, the feathers margined with gray; primaries brownish ash, secondaries mostly white, some of the outer ones dark ash; the fore neck and upper part of the breast bright chestnut red, sides of the same color, intermixed with dusky; abdomen silky white; bill bluish black, yellow at the tip; loreal space bright carmine; iris carmine, with an inner circle of white; tarsi and feet dusky gray externally, dull yellow internally, and on both edges of the tarsus.

Length, about 14 inches; extent, 24; wing, $5\frac{3}{4}$; bill, 1; tarsi, $1\frac{3}{4}$.

Young: The whole upper plumage grayish black, darkest on the head, feathers of the back with gray margins; throat, sides of the head, a broad space on the sides of the neck, nearly meeting behind, breast and abdomen, silvery white; sides and lower part of abdomen dusky.

Hab.—Generally distributed, specimens being in the collection from the Atlantic States, the interior ones, and the Pacific coast.

The horned grebe is abundant between the parallels of 45° and 49° north latitude, from the Mississippi river to the Pacific. I obtained specimens at St. Paul, Minnesota, also in western Minnesota, near Nebraska, and from the salt waters of Puget Sound. Many birds of this species breed on the saline lakes so abundant in the western portion of Minnesota. It is a winter resident of Puget Sound, where it is known as the *Ho-hwhy* by the Nisqually Indians.

Like other species of the genus this grebe has the power of remaining for a considerable time under water. It dives very quickly, and is very difficult to capture when wounded. I have not noticed it float about entirely submerged, excepting the bill and head, as others do when anxious to avoid detection, but suppose that this instinct is as common to it as the other habits, which are so similar between the different species.—S.

The horned grebe appears along the coast in September and October in large numbers. It has the usual habits of the grebes, living on fish, for which it dives, and depending less on its wings than its feet for escape, though able to fly well when compelled to. One which I opened had its stomach full of a marine grass. In April they retire beyond the Territory. Their only cry is faint and bleating.—C.

PODICEPS CALIFORNICUS, Heermann.

The California Grebe.

Podiceps californicus, HEERM. Proc. Acad. N. Sc. Phil. VII, 1854, 179.—BAIRD & LAWRENCE, Gen. Rep. Birds, 896.

SP. CH.—*Winter Plumage*: The entire upper plumage is blackish brown, nearly black on the head; primaries brownish ash, some of the inner ones tipped with white; secondaries white, with their basal portions dark ash; under parts silky white, the neck in front light ash, and the sides and lower part of abdomen brownish ash; under linings of the wings white; bill dark brown, the base of the lower mandible yellowish, and its tip light horn color; iris yellowish gray; tarsi and feet externally dark green, on the inside yellow.

Length, 12 inches; wing, 5; bill, $\frac{7}{8}$; tarsus, $1\frac{1}{2}$.

Hab.—California, headwaters of Missouri and Columbia rivers.

I obtained a specimen of the California grebe in the St. Mary's valley, (W. T.,) lying between the Rocky and Bitter Root mountains. The bird was badly injured in the head by a rifle ball, so as to puzzle me very much while attempting to compare it with the recorded descriptions of the different species to which I had access. In habits this grebe appears nearly related to the *P. cornutus*.—S.

PODILYMBUS PODICEPS, (Linn.) Lawr.

The Pied-Bill Grebe.

Colymbus podiceps, LINN. S. N. 1766, 223.

Podiceps carolinensis, LATH. Ind. Orn. II, 1790, 785.—BONAP. Syn. 1828, No. 367.—RICH. & SW. F. B. A. II, 1831, 412.—NUTT. Man. II, 1834, 259.—AUD. Orn. Biog. III, 1835, 359: V, 1839, 624.—IB. Birds Am. VII, 1844, 324; pl. cccclxxxiii.

Podilymbus lineatus, HEERMANN, Proc. Acad. N. S. Phil. VII, 1854, 179.

Podilymbus Podiceps, BAIRD & LAWRENCE, Gen. Rep. Birds, p. 898.

"SP. CH.—*Adult*: Upper plumage very dark brown; primaries dark ash; secondaries ash on the outer webs and white on the inner; bill pale blue, dusky on the ridge of the upper mandible, both mandibles crossed with a broad black band, including the nostrils; chin and throat marked with a conspicuous black patch nearly two inches in extent; cheeks and sides of the neck brownish gray; lower part of the neck, upper part of the breast, and the sides, dull rusty brown, spotted and rather indistinctly barred with brownish black; lower part of breast and abdomen grayish white, mottled with dusky spots; iris, brown; tarsi and feet, grayish black.

"Length, 14 inches; wing, $5\frac{1}{4}$; bill, $\frac{7}{8}$; tarsus $1\frac{1}{2}$.

"*Young*: The throat is white and the bill without the transverse black band, the under plumage more silvery white; in other respects the same as the adult. Some specimens, probably the birds of the year, have whitish lines on the sides of the head. I compared a specimen in this plumage with Dr. Heermann's type of *P. lineatus*, and found them precisely alike."—Lawrence.

Hab.—Atlantic States generally. Texas and New Mexico. California and Oregon.

Several specimens of the pied-bill grebe were obtained by me at Fort Steilacoom.

In winter it frequents the salt waters of the sound, but in summer breeds abundantly on the small fresh water lakes of the vicinity.—S.

While at the Straits of De Fuca, in March, 1855, I frequently heard in the marshes along shore a loud noise much like the squeaking of young pigs, and, though often very near me, I could never see what produced it. Soon after I noticed the dabchicks in the ponds, and heard them utter their loud, sonorous call, more like the braying of a jackass than anything else I can compare it to. Though the sounds before heard were different, I have little doubt that this little bird was the performer, probably entirely sunk under water except its bill.

In the small and beautiful lakes near Puget Sound they were abundant, commonly a pair in each; and on the 11th June I had the pleasure of finding a nest containing four eggs, just ready to hatch. It was, unlike that seen by Audubon, built *upon the water*, where it floated securely, kept in place by the stalks of spirea which grew thickly around it. Being constructed entirely of stalks of grass, it was soaked through with water, but, as the pond was stagnant, the water was warm enough not to prevent the hatching of the eggs. Its shape was conical, a foot wide at the base and about nine inches at the top, where it was slightly hollowed out. Since its construction it must have subsided with the water two feet, though there was still three feet depth of water under it. The eggs were as large as a pullet's, white, with a pale brown crust, and nearly equal in size at each end.

As the lakes often are frozen for a very short time only, and the rivers not at all in mild winters, this grebe may sometimes remain throughout the year.—C.

Family ALCIDAE.—The Auks and Puffins.

MORMON CIRRHATA, (Pallas,) Bon.

The Tufted Puffin.

Alca cirrhata, PALLAS, Spicilegia Zoologica, pt. V, p. 7, (1769,) Gm. Syst. I, 1788, 553.

Mormon cirrhatus, BON. Syn. 1828, 429.—AUD. Orn. Biog. III, 599; pl. 293.—IB. Syn. 343.

Mormon cirrhata, (PALLAS,) BAIRD & CASSIN, Gen. Rep. Birds, p. 902.

FIGURES.—Buff. Pl. Enl. 761.—AUD. B. of Am. pl. 249: oct. ed. VII, pl. 462.

SP. CH.—The largest species of this genus, general form short and stout, head large, bill much flattened laterally, entirely horny, upper mandible composed of three parts or lamina, the first of which, next to the frontal feathers, is narrow and covered with minute spots, the second smooth, with the apertures of the nostrils inserted at its lower edges, and with an elevated sub-cylindrical process on its upper edge or the culmen of the bill; third with two or three transverse curved grooves, and somewhat hooked at the tip; under mandible smooth. Head with two crests of elongated pendant feathers from behind the eyes; wings rather short, tail short, legs and feet strong, claws sharp.

Two first parts of the bill yellowish green, terminal part and under mandible reddish yellow or orange, the under mandible greenish at base. Crests pale yellow; plumage around the base of the bill, including the eyes, white. All other parts of the plumage brownish black, darker on the head and back; legs bright orange red.

Total length, about 15 inches; wing, 8; tail, 3 inches.

Hab.—Western coast of America; California; accidental on the coast of Maine, (Mr. Audubon.)

I obtained a specimen of mormon from the vicinity of the Straits of Fuca, which was kindly presented to me through George Gibbs, esq., by Captain Fowler, of the schooner R. B. Potter. The range of the species probably extends as far south as the Farralone islands, off San Francisco bay, as certain specimens there obtained were seen by me in collections in San Francisco.—S.

CERORHINA MONOCERATA, (Pallas,) Cassin.

The Horned-billed Guillemot.

Alca monocerata, PALLAS, Zoog. Rosso-Asiat. II, 1811, 362.

Cerorhyncha occidentalis, BONAP. Ann. Lyc. N. Y. II, 1828, 428.

Ceratorhyncha occidentalis, BONAP. Comp. List, 1838, 66.—AUD. Orn. Biog. V, 1839, 104; pl. 402.

"*Cerorhina orientalis*, BONAP." BRANDT, Bull. Acad. St. Petersburg, I, 1837, 345.

Cerorhina monocerata, (CASSIN,) BAIRD & CASSIN, Gen. Rep. Birds, 905.

SP. CH.—Bill rather large, flattened laterally; upper mandible with an upright horny appendage at its base, the top or termination of which is frequently broken or worn off; angle of under mandible very distinct, and having the appearance of being a distinct piece; wings moderate, pointed; tail short, rounded; legs short, robust. Head and entire upper parts dark fuliginous; lighter and tinged with ashy on the throat and neck in front; darker and nearly black on the back and rump. A line of long yellowish white feathers over and behind the eye and another from the corner of the mouth. Under parts of body white; under wing coverts and sides ashy brown; bill dark orange; legs light colored.

Total length, about 15 to 15½ inches; wing, 7½; tail, 2½; bill to gape, 2 inches.

Hab.—Northwestern and western coasts of America; northeastern Asia; Japan, (Com. Perry's Expedition.)

This curious bird, first described by Bonaparte from specimens said to have been brought from the west coast of America, is found moderately abundant on the lower part of Puget Sound and in the Straits of Fuca. In the summer of 1854 I obtained a couple of young birds from the vicinity of Port Townsend, Washington Territory. Unfortunately they were destroyed by rats. Protection island, near the last mentioned locality, is said to be a favorite breeding ground of the species, where, according to the accounts given me by Indians, they breed in holes dug in the steep banks, like those of the black guillemot, and are said to have much the same habits. The most remarkable feature of the bird is the characteristic singular wax-yellow protuberance on the bill.

Dr. Ayres, of San Francisco, had in his cabinet a specimen of this species obtained by him from the Farralone islands.—S.

CERORHINA SUCKLEYI, Cassin.

Cerorhina suckleyi, (CASSIN,) BAIRD & CASSIN, Gen. Rep. Birds, p. 906.

SP. CH.—Smaller than the preceding, and with the bill much more narrow laterally; plumage darker. Bill shorter than the head; upper mandible curved towards the end, without distinct basal knobs; under mandible with the angle very distinct; bill rather widened at the base, compressed towards the end; wings short; tail very short. Entire upper parts brownish black, darker and nearly clear black on the head and back. Throat, neck, and upper part of breast dark cinereous;

lower part of breast and abdomen white; sides and under wing coverts cinereous; bill light at base, dark at the end; feet dark yellow.

Total length, about $12\frac{1}{2}$ inches; extent, 24 inches; wing, $6\frac{1}{2}$ inches; tail, $1\frac{3}{4}$ inch; iris pale hazel.

Hab.—Steilacoom, Puget sound.

A single specimen of the *cerorhina suckleyi* was obtained by me at Steilacoom, Puget Sound, January 28, 1856. A description of the bird in detail was noted at the time, and is as follows: Membrane at base of upper mandible grayish dusky black; the knob slightly more grayish and more soft than the knob of the *cerorhincha occidentalis*; middle of both mandibles dingy orange, their tips dusky; iris pale hazel; under surface of the webs of the feet, and the posterior aspect of the tarsi dusky black; upper surface of the toes bluish white, darker about the articulations; nails black; no hind toe.

Upper surface of body from forehead to tip of tail, including back of neck, scapulars, and wings, brownish black, almost jet black posteriorly; concealed inner webs of primary and secondary quills dusky; lores, chin, cheeks, and anterior surface of throat and neck dusky brown, paler beneath on the fore part of the breast; under surface of the wings and sides of the same color; belly and breast white, many of the feathers faintly tipped with pale dusky; neck very full; no white is seen on the upper surface.

Although the Indians informed me that the species is not uncommon in the waters of the sound, I never obtained another specimen, and doubt whether I ever saw any others among the many divers, guillemots, &c., which are so common there in the winter season.

The individual obtained dived with great facility when wounded, and seemed as much at home under water as a podiceps or loon. It was killed in deep water, about half a mile from the shore. The skin when examined by Mr. Cassin had no knob on the bill. This being fleshy, had probably shrunk so as not to be apparent.—S.

URIA COLUMBA, (Pallas,) Cassin.

The Western Guillemot.

Cepphus columba, PALLAS, Zoog. Rosso-Asiat. II, p. 348, (1811.)

Uria mandtii, LICHT. Verz. p. 88, (1823)?

"*Uria mandtii*, LICHT. Mus. Dresd."—REICH. Vollst. Naturg. Schwimmv. pl. 4, fig. 47.

Uria columba, BAIRD & CASSIN, Gen. Rep. Birds, p. 912.

FIGURES.—Voy. Vincennes and Peacock, Birds, pl. 38, fig. 1.

SP. CH.—Rather larger than the preceding; bill larger and stronger. White space on the wing, divided by a band of brownish black running diagonally from the edge of the wing; under wing coverts dark ashy, frequently tipped with white; axillary feathers ashy brown. All other parts of the plumage brownish black, with a greenish lustre, and frequently tinged with ashy on the back. Bill black; feet red. *Younger and winter plumage*: Upper parts brownish black; under parts white, generally more or less spotted with dark brown; white space on the wing, as in summer, but frequently less distinct. The lining membrane of the mouth of adult birds is of a fiery red; tarsi and feet of a deep red, with a tinge of lake; bill black; iris brown; claws black. A male, killed in August, 1856, measured $14\frac{1}{2}$ inches in length; extent, $24\frac{3}{4}$; wing 7.

Hab.—Western and northwestern coast of America. Kamtschatka, (North Pacific Surveying and Exploring Expedition, Captain Rodgers, United States navy.)

The western guillemot is found abundantly throughout Puget Sound, being generally present at all seasons in greater or less numbers, but least abundant in winter. It breeds in steep, bold banks overhanging the salt water—burrowing out holes which extend two or three feet back from the entrance, and, according to the statements of the Indians, laying several white eggs. By reason of some prejudice the natives will not eat this bird; why, I cannot say, as they are fond of fishy-tasting birds, and prefer eating surf-ducks, of strong rank flavor, to

mallards. The present bird dives with quickness and facility, and in this manner, like many others of its class, it endeavors to escape when wounded. There are several bare rocks projecting out of the water off the mouth of Hood's Canal, which, during the summer and early fall, are much resorted to by these birds, who at this season appear to be gregarious. They sit on the rocks during the middle of the day—many of them almost motionless—apparently resting after the fatigue of the morning's feed. At the approach of a gunner they show a little apprehension, but, as a general rule, do not fly until at least one discharge is fired. They then make for some other point, or alight in the water at a distance. Individuals or small companies of two or three desultorily return in a short time, and can generally be readily killed. If wounded, and the bird falls in the water, it usually displays as great dexterity in diving and other manœuvres to escape death or captivity as any one of the group.

During the spring months and the breeding season they are partially gregarious, being frequently found in small companies of four or five individuals.—S.

The black guillemot is a common resident in Puget Sound and the waters northward. It burrows holes several feet deep in the sandy cliffs, at heights of from 20 to 200 feet above the water, the entrance being within two feet of the top of the ground, and the burrow winding horizontally inwards. I was not there when they had eggs or young, but from their frequently flying in and out in March I suppose that they were preparing to lay. The young are fledged in August, and are then caught by the Indians by digging down to the nest. This bird has got the name of "bank duck" from the settlers there.—C.

BRACHYRAMPHUS MARMORATUS, (Gmelin,) "Brandt."

Colymbus marmoratus, GMELIN, Syst. Nat. I, 1788, 583.

Uria townsendii, AUD. Orn. Biog. V, 1839, 251, pl. 430.—TOWNSEND, Narrative, 1839, 352.

Brachyramphus marmoratus, BAIRD & CASSIN, Gen. Rep. Birds, 915.

FIGURES.—Lath. Gen. Syn. VI, pl. 96.—Pennant, Arc. Zool. II, pl. 22.—Aud. B. of Am. pl. 430; oct. ed. VII, pl. 475.

SP. CH.—Small; bill slender, distinctly notched near the end; frontal feathers advancing upon it to near half its length. Wings short; tail very short; legs and feet short and weak. Entire upper parts brownish black, tinged with ashy on the back. Scapular feathers white, forming two conspicuous spots on each side of the back; ring around the back of the neck white. Under parts white; under wing coverts dark ashy brown; longitudinal stripes on the side ashy brown; bill black; feet yellow.

Younger: Upper parts brownish black, with the feathers tipped and edged with dull reddish; under parts spotted and marbled with brownish black and white.

A small guillemot, apparently of this species, I have seen quite abundant on the waters of Puget Sound during the winter season. They were quite active, and dived with as much facility apparently as the grebes, but seemed not to have the power of staying under as long, or of traversing such a distance beneath the surface as birds of the latter group. I obtained a single specimen, which, having been brought to me dead, threw no additional light upon the history of the species.—S.

This bird, in winter, remains in the bays in considerable numbers. In summer it probably frequents the ocean only, as I have frequently seen what I supposed to be this bird all the way southward to San Francisco. It often starts from under the bow or paddle wheels of the steamers and flies rapidly a short distance before plunging again. Where it breeds I never could ascertain, but think it is not anywhere in Puget Sound.

Length, $10\frac{1}{2}$; extent, $18\frac{1}{4}$. Iris brown; bill and feet black.

A specimen I found dead at Shoalwater bay, in September, 1854, was smaller, and had a different bill, being probably an immature bird.

Length, 9 inches; extent, 16.25. Iris grayish; bill and feet pale flesh color.—C.

BRACHYRAMPHUS TEMMINCKII, Brandt.

Brachyramphus temminckii, BRANDT, Bull. Acad. St. Petersburg, II, 1837, 346.—BAIRD & CASSIN, Gen. Rep. Birds, p 916.

Uria umizusume, TEMM. Faun. Jap. Aves, p. 123.

FIGURES —Temm. Pl. Col. pl. 579.—Temm. & Schleg. Faun. Jap. Aves, pl. 79.

SP. CH.—Small; bill rather lengthened and slender, a crest of long erectile feathers in front; wings rather short; tail short, rounded; legs and feet short and rather weak. Crest feathers black; longitudinal stripes on the top of the head, throat, back of the neck, and longitudinal wide stripe on the sides throughout the length of the body, brownish black. Back, wing coverts, and rump light cinereous; quills and tail brownish black. Wide stripes over each eye, uniting on the occiput, white. Entire under parts white; under wing coverts white; feet light colored; culmen dark brown. *Female and winter plumage?*—No crest; head above brownish black; throat ashy brown; stripe on the sides ashy, frequently with circular spots of white.

Length of male, $9\frac{3}{4}$ inches; extent, $17\frac{3}{4}$; wing, $5\frac{1}{4}$; tail, $1\frac{1}{2}$ inch. Iris brown; bill blackish; feet gray; inside of mouth dusky anteriorly, pale posteriorly.

Hab.—Northwestern coast of America; northern Asia.

This bird is quite common during the late fall and winter months on Puget Sound. I have also seen it sparingly during the summer season, and have killed a specimen in July. I suppose that a few breed in the vicinity, although I never could ascertain certainly.

In habits this species resembles much the guillemots, diving readily and quickly when alarmed. It is probable that it has the power of using its wings while under water in the same manner as the loons and other divers; this, I suspect, from the quickness that one while under water will traverse long distances. Their power of remaining beneath the surface appears, however, to be much more limited than that of the grebes. A specimen killed by me, July 18, 1856, had the feet and legs dusky flesh color; bill *nearly black*. The upper and lower eyelids each had a small spot of white upon them, a character which, in the dried skins, may not usually be apparent. When folded the wing tips reached exactly to the end of the tail.—S.

This sea dove resides, during winter, in the sounds and bays of the Territory in large numbers, though not gregarious. In March they migrate further north for the summer, and are then seen in pairs at some distance from the shore.—C.

List of Birds heretofore reported as found in the northwest part of America, but of which no specimens have been procured by recent explorers.

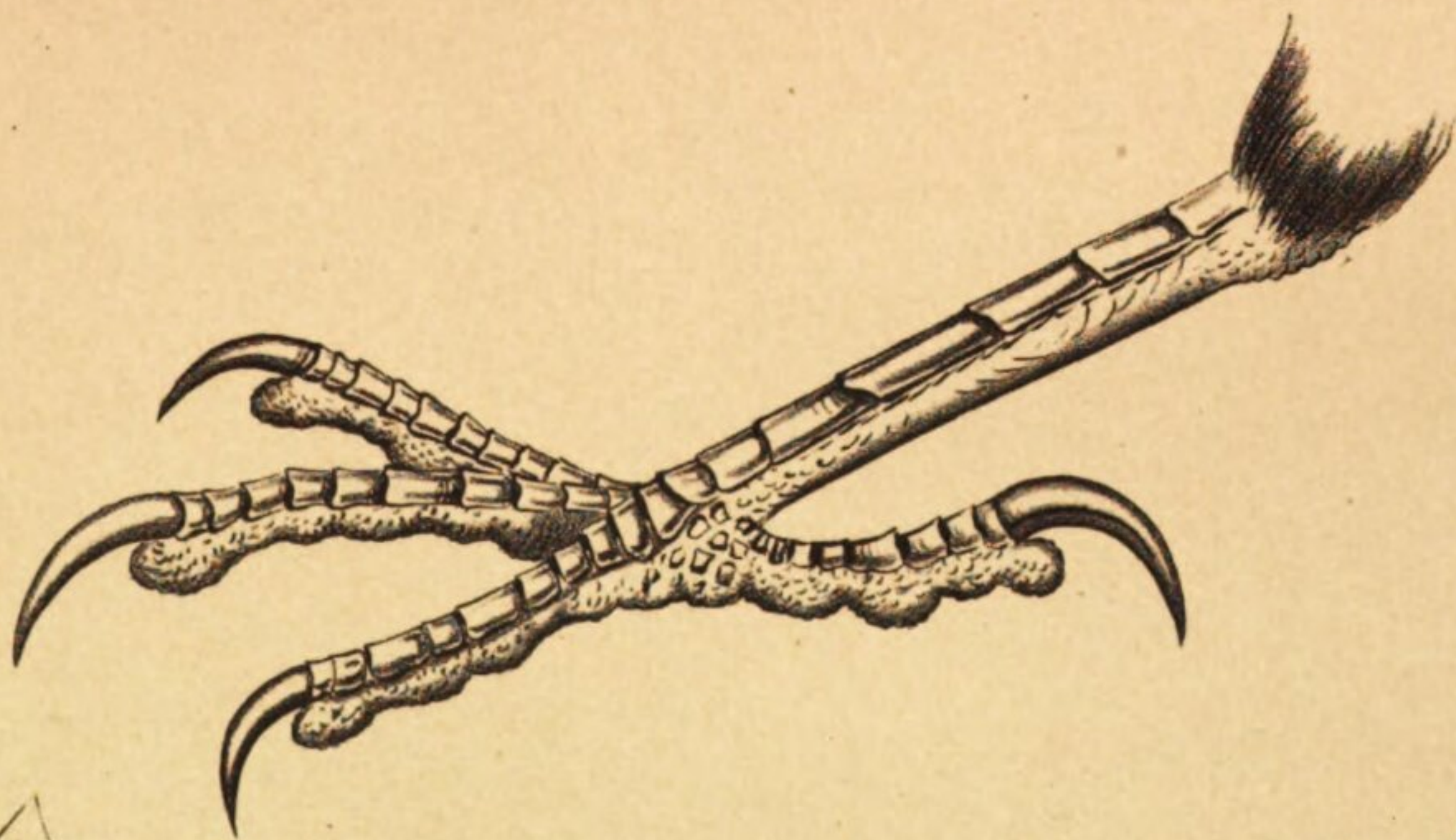
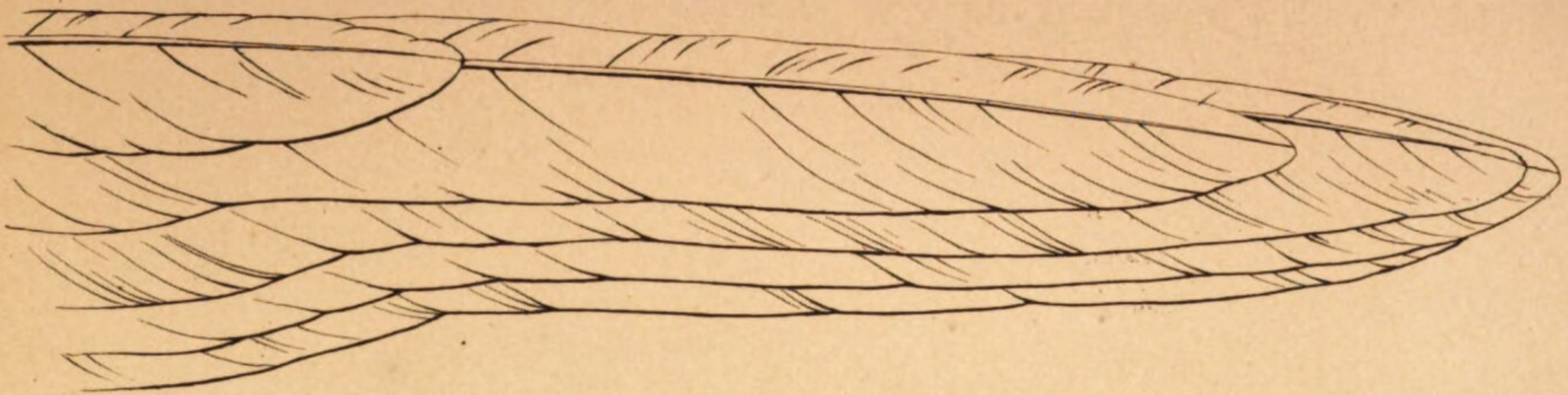
- Cathartes californianus*, (Cuvier.)—Obtained from the Columbia river by Dr. J. K. Townsend.
Cathartes atratus, (Less.)—Audubon's Synopsis.
Falco anatum, (Bon.)—Townsend & Nuttall. Replaced by *Falco nigriceps*.
 " *Falco aesalon*."—Towns. & Nutt. European species. Replaced by *F. columbarius*.
 " *Buteo vulgaris*."—Aud. Synop.; Townsend's List. European species.
Buteo swainsoni, (Bon.)—Nuttall, (perhaps *B. montanus*.)
Buteo borealis, (Gm.)—Aud.; Nutt. Replaced west of Rocky mountains by *B. montanus*.
Archibuteo sancti-johannis, (Gray.)—Towns. List. Replaced by *A. lagopus*.
Aquila canadensis.—Towns. List. Under the name of *A. chrysaetos*.
Strix pratincola, (Bon.)—Cassin, Illust., &c. Found in California.
Otus vulgaris.—Towns. List.—Perhaps mistaken for *O. wilsonianus*, of which specimens have been collected.
Otus brachyotus.—Towns. List; Aud. Synop. Probably the *Brachyotus cassinii*, (Brew.,) which is found in California.
Nyctea passerinoides.—Aud. Synop. and Towns. Was really *Glaucidium gnoma*, (Wag.,) of which several specimens have been obtained from Washington Territory.
Nyctea nivea, (Gray.)—Aud. Synop.
Surnia ulula, (Bonap.)—Aud. Synop. Under name of *S. funerea*.
Coccygus americanus, (Bonap.)—Nutt. Man.
Campephilus imperialis, (Gray.)—Towns. (Mexican species.)
Picus villosus,? (Linn.)—Nutt. " *P. septentrionalis*." Replaced by *P. harrisii*.
Picus pubescens, (Linn.)—Towns. List. Replaced by *P. gairdneri*.
Picus lineatus.—Towns. & Aud. A South American species. (See Pacif. R. R. Reports, IX, p. 125.)
 " *Black red-backed woodpecker*."—Townsend's List. No specimen ever obtained.
Atthis anna, (Reich.)—Towns. List. " *Trochilus anna*."
Myiarchus crinitus, (Cab.)—Towns. List. " *Muscicapa crinita*."
Sayornis fuscus, (Gm.)—Towns. " *Muscicapa fusca*."
Sayornis sayus, (Baird.)—Has been obtained from California. Aud. & Towns. " *M. saya*."
Contopus richardsonii, (Baird.)—Obtained on the Columbia by Dr. Townsend.
Contopus virens, (Cabanis.)—Aud. and Towns. " *Muscicapa virens*." Eastern Oregon?
Empidonax traillii, (Baird.)—Aud. and Towns. Eastern Oregon?
Turdus pallasi,? (Cab.)—Towns. List. " *T. minor*." Eastern Oregon?
Turdus fuscescens, (Steph.)—Towns. List. " *T. wilsonii*." Eastern Oregon?
Sialia sialis, (Linn.)—Audubon. " *S. wilsonii*." Eastern Oregon?
Hydrobata mexicana, Baird.—T. (The species (varieties?) " *Mortoni*" and " *Townsendii*," mentioned in Townsend's Narrative, have not been recognized in the late collections.)
Mniotilta varia, (Vieill.)—Aud. Synopsis. Said to be generally distributed.
Icteria viridis,? (Bonap.)—Towns. & Nuttall. Seen at Walla-Walla, Washington Territory.
Helminthophaga ruficapilla, (Baird.)—Audubon. " *Vermivora rubricapilla*." East Oregon?
Seiurus aurocapillus, (Sw.)—Towns. & Nuttall. " *Turdus aurocapillus*." East Oregon?
Dendroica coerulea, (Baird.)—Aud. & Towns. " *Sylvicola coerulea*." East Oregon?
Dendroica striata, (Baird.) Aud. " *S. striata*." East Oregon?

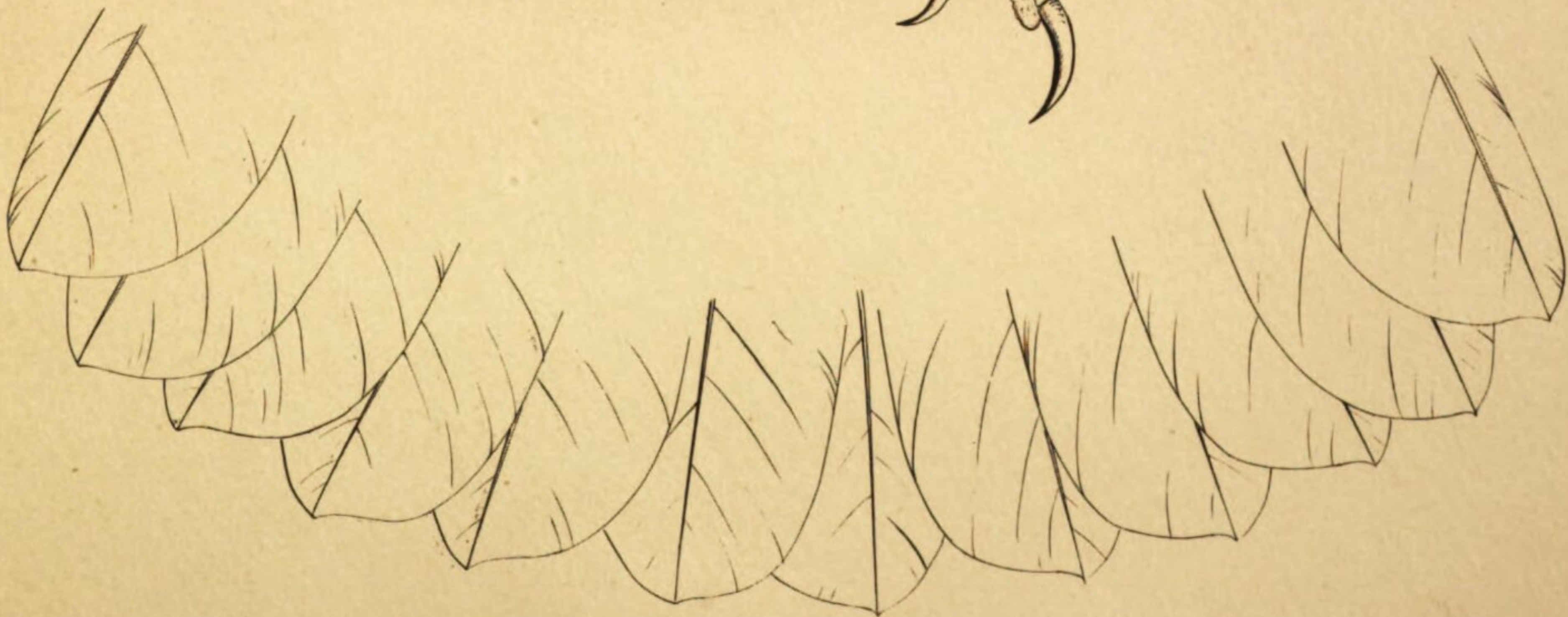
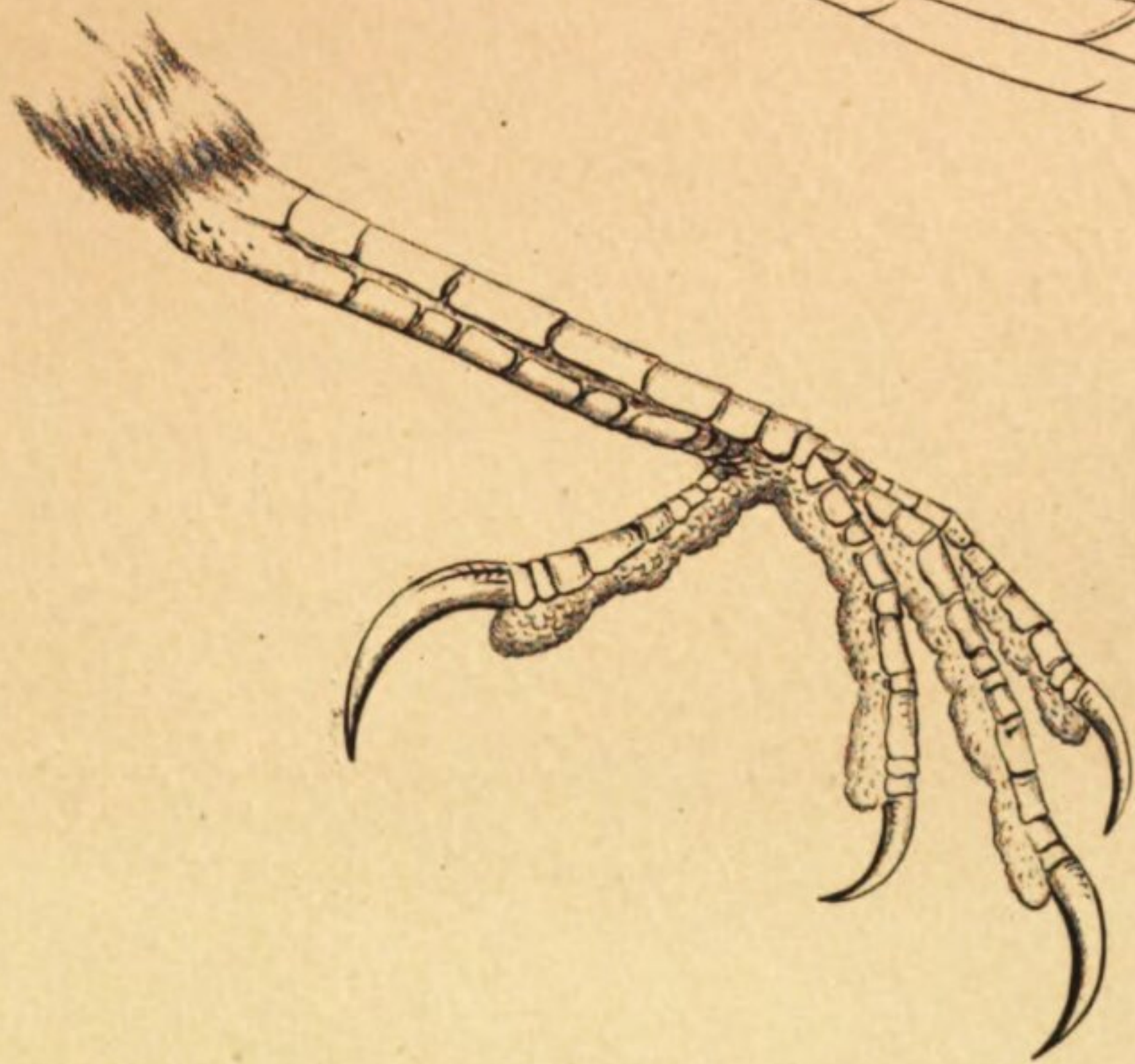
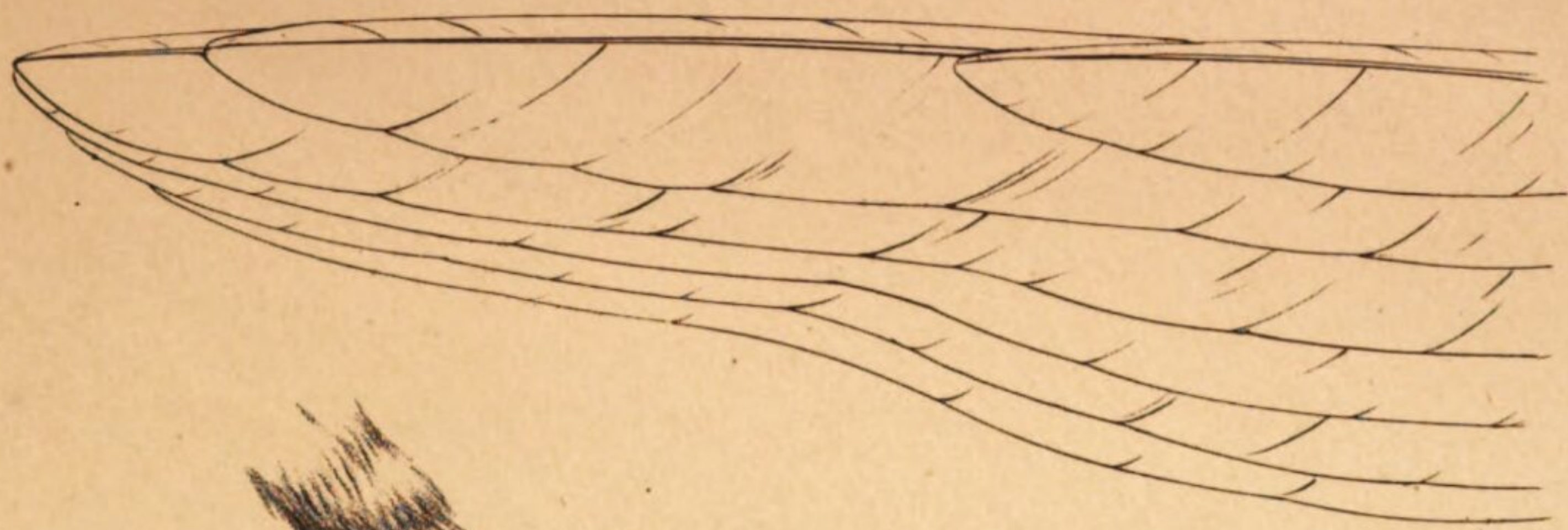
- Cotyle riparia*, (Boie.)—Aud. "*Hirundo riparia*," perhaps *serripennis*.
Collyrio ludovicianus, (Linn.)—Aud. & Towns. "*Lanius ludovicianus*."
Vireo virescens, (Vieill.)—Nuttall. *Vireo bartramii*; probably South American.
Vireo noveboracensis, (Bon.)—Aud. Synops.; Towns. List; perhaps *V. cassinii*.
Salpinctes obsoletus, (Cab.)—Aud. Synop.; Towns. List. "*Troglodytes obsoletus*." Eastern Oregon.
Troglodytes aedon, (Vieill.)—Aud.; Towns. Eastern Oregon.
Troglodytes americanus, (Aud.)—Nuttall's Manual. Eastern Oregon.
Troglodytes maculosa, (Nutt.)—Nutt. Only seen by him.
Sitta carolinensis, (Gm.)—Aud.; Towns. Replaced by *S. aculeata*, Cassin.
Sitta canadensis, (Linn.)—Aud.; Towns.
Parus atricapillus, (Linn.)—Towns. Replaced by *P. occidentalis*, Baird.
Carpodacus frontalis, (Gray.)—Towns. Common in California.
Plectrophanes ornatus, (Towns.)—Aud. "Rocky mountains."
Zonotrichia leucophrys.—Towns. "*Fringilla leucophrys*." Replaced by *Z. gambelii*, (Gambel.)
"*Fringilla maculata*."—Towns. A very uncertain bird.
Junco hyemalis, (Sclat.)—Towns. "*Emberiza nivalis*." Eastern Oregon.
Spizella monticola, (Gm.)—Towns. "*Emberiza canadensis*." Eastern Oregon.
Spizella pusilla, (Wils.)—Towns. "*Emberiza pusilla*." Eastern Oregon.
Calamospiza bicolor, (Bon.)—? *F. corydalina*. "*F. bicolor*." Eastern Oregon.
Guiraca coerulea, (Sw.)—Aud. Synop. "*Coccyborus caeruleus*." Eastern Oregon.
Pipilo arcticus, (Sw.)—Aud. Synop. Eastern Oregon.
Sturnella magna, (Sw.)—Aud.; Towns. "*Sturnella ludoviciana*." Replaced by *S. neglecta*.
Icterus baltimore, (Daud.)—Aud. Synop. Replaced by *I. bullockii*.
Scolecophagus ferrugineus, (Sw.)—Aud.; Towns. "*Quiscalus ferrugineus*," replaced by *S. cyanocephalus*.
Corvus cacalott, (Wagl.)—Aud.; Towns. "*C. corax*." Replaced by *C. carnivorus*.
Corvus ossifragus, (Wils.)—Aud.; Towns. Replaced by *C. caurinus*, Baird.
Cyanocitta ultramarina, (Bon.)—Aud.; Towns. "*Garrulus ultramarinus*."
Ectopistes migratoria, (Sw.)—Towns. List. Eastern Oregon.
"Long Black-Tailed Pheasant."—Seen west of South Pass, by Townsend.
Tetrao canadensis, (Linn.)—Aud.; Towns. Replaced by *T. franklinii*.
Bonasa umbellus, Steph.—Aud.; Towns. Replaced by *B. sabinii*.
Lagopus leucurus, (Sw.) Towns. List. Doubtless near the snowy peaks.
Grus americana.—Aud.; Towns. Replaced by *Grus canadensis*.
Nyctiardea gardeni, (Baird.)—Towns. "*Ardea nycticorax*." Common in California.
Aegialitis montanus, (Cass.)—Towns. List. Eastern Oregon.
Haematopus ater, (Vieill.)—Aud. Synop. ? "*H. townsendii*." A South American species.
Phalaropus wilsonii, (Sab.)—Towns. Eastern Oregon?
? *Gallinago*.—? Aud.; Nutt. "*Scolopax Drummondii*" and "*S. douglasii*." Probably varieties of *Gallinago Wilsonii*, of which there are many specimens in the collections.

- Tringa bonapartii*, (Schl.)—Towns. "*T. schinzii*." Perhaps found in eastern Oregon.
- Symphemia semi-palmata*, (Gm.)—Aud.; Towns. Perhaps found in eastern Oregon.
- Gambetta flavipes*, (Bon.)—Towns. List. Perhaps found in eastern Oregon.
- Numenius borealis*, (Lath.)—Towns. List. Perhaps found in eastern Oregon.
- Porzana carolina*, (Vieill.)—Towns. "*Rallus crepitans*." Perhaps found in eastern Oregon.
- Anas obscura*, (Gm.)—Aud. Synop. Perhaps found in eastern Oregon.
- Querquedula discors*, (Steph.)—Aud.; Towns. "*Anas discors*." Perhaps in eastern Oregon.
- Bucephala islandica*, (Baird.)—Nutt. "*Clangula barrovii*." Perhaps found in eastern Oregon.
- Polysticta stelleri*, (Eyton.)—Aud.; Northwest coast. "*Fulig. dispar*."
- Pelicanus erythrorhynchus*, (Gm.)—Aud. "*P. americanus*." More southern.
- "*Pelicanus onocrotalus*."—Towns. Probably the preceding.
- Graculus penicillatus*, (Bonap.)—Obtained by Dr. Townsend from the mouth of the Columbia.
- Diomedea chlororhycha*, (Gm.) Aud. Synop. Either *D. brachyura*, or from South America.
- "*Diomedea fusca*."—Aud.; Towns. Either *D. brachyura*, or from South America.
- Procellaria gigantea*, (Gm.)—Aud. Probably from farther north.
- Procellaria pacifica*, (Aud.)—Aud; north Pacific coast of America. Probably from farther north.
- Procellaria tenuirostris*, (Aud.)—Aud; north Pacific coast of America.
- Thalassidroma wilsoni*, (Bon.)—Towns. Probably replaced by *T. furcata*.
- Puffinus obscurus*, (Lath.)—Nuttall. Very doubtful.
- Larus glaucus*, (Brünn.)—Towns. Doubtless *L. glaucescens*.
- Larus marinus*, (Linn.)—Aud. Perhaps more northern.
- Rissa brevirostris*, (Brandt.)—Northwest coast of America.
- Rissa nivea*, (Bruch.)—Russian America.
- Sterna plumbea*.—Towns. "*Sterna nigra*." Eastern Oregon?
- Colymbus arcticus*, (Linn.)—Aud. Synop. Eastern Oregon?
- Podiceps griseigena*, (Gray.)—Towns. "*P. rubricollis*." Probably *occidentalis*.
- "*Podiceps minor*."—Town. List. European species. Probably *californicus*.
- Sagmatorrhina labradoria*, (Cass.)—North Pacific.
- Mormon corniculata*, (Naum.)—Northern seas.
- Mormon glacialis*, (Leach.)—Northern seas.
- Cerorhina monocerata*, (Cass.)—Aud. "*Uria occidentalis*." Obtained at Puget Sound and lost.
- Phaleris cristatellus*, (Bon.)—Aud. Northwest coast. Doubtless more northern.
- Phaleris nodirostris*.—Aud. Northwest coast. Doubtless more northern.
- Phaleris tetracula*, (Steph.)—Coasts of north Pacific. Doubtless more northern.
- Phaleris camtschatica*, (Cass.)—"Coasts of North America." Doubtless more northern.
- Phaleris microceros*, (Brandt.)—Coasts of north Pacific. Doubtless more northern.
- Phaleris pusillus*, (Pallas.)—Coasts of north Pacific. Doubtless more northern.
- Ptychorhamphus aleuticus*, (Brandt.)—North Pacific. Doubtless more northern.
- Ombria psittacauda*, (Esch.)—Coast of north Pacific. Doubtless more northern.









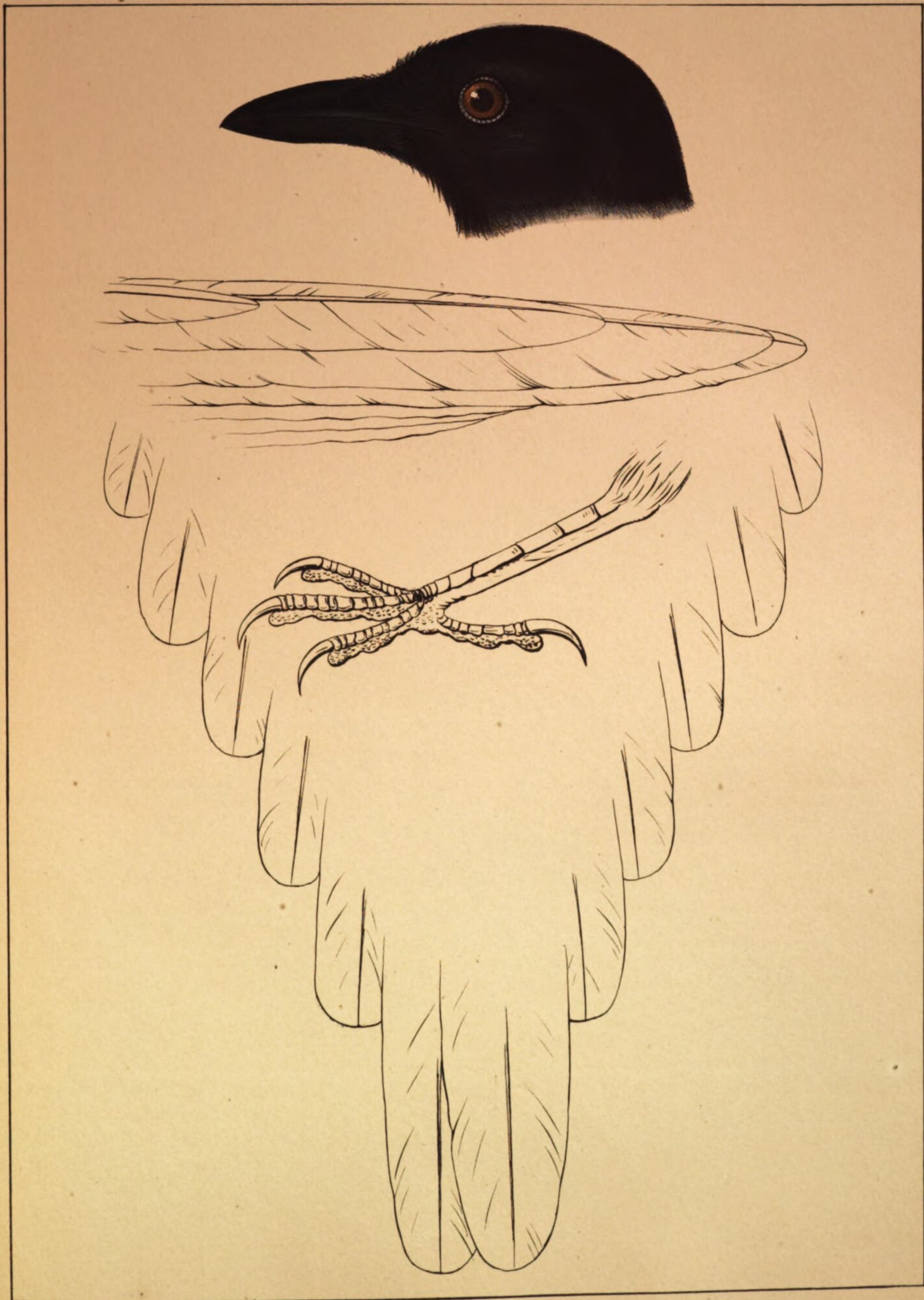






Fig. 2.



Fig. 1.



Uria grylle, (Lath.)—Replaced by *U. columba*.

Uria carbo, (Pallas.)—Coasts of north Pacific.

Uria ringvia, (Brünn.)—Pacific coast. Specimens obtained from California.

Brachyrhamphus wrangelii, (Brandt.)—Aleutian islands.

Brachyrhamphus kittlitzii, (Brandt.)—North Pacific.—S. & C.

REPORT UPON THE REPTILES COLLECTED ON THE SURVEY.

BY J. G. COOPER, M. D.

CLASS REPTILIA. Reptiles.

Order I. CHELONIA. The Turtles.

AGGATHEMY MARMORATA, Agassiz.

The Western Pond Turtle.

This species was first described by Agassiz in his "Reptiles of the United States," vol. I, p. 152, fig. 1. It was also described by Cope in his "Reptiles of the United States," vol. I, p. 152, fig. 1. It was also described by Cope in his "Reptiles of the United States," vol. I, p. 152, fig. 1.

Mr. G. Cooper collected this species at Fort Steilacoom, Washington, on July 1st, 1871. It was found in the ponds about the fort. It is a very common species in the ponds about the fort.

This is the only turtle known from the west of the Rocky mountains, in common in fresh water ponds and rivers west of the Cascade mountains though less so in the Columbia than in the warmer ponds. Mr. Gibbs also saw turtles at the mouth of the Yakima which were probably of this species. It is rather difficult to catch, being very watchful, but will sometimes bite at a hook. The specimen I preserved was taken when about to deposit its eggs, on the 9th of June. I tried to hatch some of them, but without success. Found in the ponds about Fort Steilacoom.—G.

It attains when full grown, a length of about eight inches, and a corresponding width. The black of the back has a brownish or rusty tinge. It is called by the Nisqually Indians "El-ah-chick."—S.

Order II. SAURIA. The Lizards.

ELIGARIA PRINCIPIS, Baird & Girard.

The Spotted Lizard.

This species was first described by Baird & Girard in their "Reptiles of the United States," vol. I, p. 152, fig. 1. It was also described by Cope in his "Reptiles of the United States," vol. I, p. 152, fig. 1.

Mr. G. Cooper collected this species at Fort Steilacoom, Washington, on July 1st, 1871. It was found in the ponds about the fort. It is a very common species in the ponds about the fort.

Several specimens of this species and *Batrachoseps* little animal were obtained about the end of July, on the "Yakima," and another pair on the banks of the Colihooft river. They

No. 4.

REPORT UPON THE REPTILES COLLECTED ON THE SURVEY.

BY J. G. COOPER, M. D.

CLASS **REPTILIA.** Reptiles.

Order I. **CHELONIA.** The Turtles.

ACTINEMYS MARMORATA, Agass.

The Western Pond Turtle.

Emys marmorata, B. & G. Proc. Acad. Nat. Sc. Phil. VI, 1852, 177.

Emys nigra, HALLOWELL, Proc. Acad. Sc. VII, 1854, 91.—IBID. P. R. R. Surv. Rep. vol. X, 1858, p. 3, pl. I.

Actinemys marmorata, AGASS. Cont. to Nat. Hist. of N. A. I, 1857, 444; II, pl. 3, fig. 5—8.—GIRARD, U. S. Expl. Exped. Herpetology, 466, pl. XXXII.

SP. CH.—Carapax elliptical, convex, with an obtuse vertebral ridge. Plastron sub-ellipsoid, broadest anteriorly. Limbs scaly, scales in front large, not imbricated; behind, moderate sub-tubercular. Nails rather stout. Tail above keeled sub-conical or tapering. Color black above, or olive with small black mottlings; beneath yellowish, with a black blotch in the young.

This, the only turtle yet known from the west of the Rocky mountains, is common in fresh-water ponds and rivers west of the Cascade mountains, though less so in the Columbia than in the warmer ponds. Mr. Gibbs also saw turtles at the mouth of the Yakima which were probably of this species. It is rather difficult to catch, being very watchful, but will sometimes bite at a hook. The specimen I preserved was taken when about to deposit its eggs, on the 9th of June. I tried to hatch some of them, but without success. Found in the ponds about Fort Steilacoom.—C.

It attains, when full grown, a length of about eight inches, and a corresponding width. The black of the back has a brownish or rusty tinge. It is called by the Nisquallies *El-la-chick*.—S.

Order II. **SAURIA.** The Lizards.

ELGARIA PRINCIPIS, Baird & Girard.

The Spotted Elgaria.

Elgaria principis, B. & G. Proc. Acad. Sc. Phil. VI, 1852, 175.—GIRARD, U. S. Expl. Exped. Herpetology, 214, pl. XXII, figs. 9—16.

SP. CH.—Dorsal scales in 48 transverse, and 14 longitudinal series. Three unequal post-nasals. Preanal shields larger than the abdominal. Tail longer than body and head together.

Several specimens of this graceful and harmless little animal were obtained about the end of July, on the "Yakolt," and another prairie on the banks of the Cathlapoot'l river. They

were found under stones, and would seem to be more in the habit of hunting their insect prey on the ground than on trees or fences. Their movements were so rapid as to make it very difficult to catch them, and in struggling to escape nearly all broke off part of their tails, which, as in other reptiles, is probably a slight loss to them, a cartilaginous growth soon supplying its place. This species seems to approach nearer the cold regions than any other, as the near vicinity of the perpetual snows of the Cascade mountains and the considerable elevation of the valley causes a very moderate temperature, even in summer, in the place where it was found.

I have seen this lizard but once since, near the mouth of the Columbia among the warm sand and drift-logs on its northern bank.

When alive the colors were light brown, with black spots; belly, pinkish white.

ELGARIA GRANDIS, Baird & Girard.

The Banded Elgaria.

Elgaria grandis, B. & G. U. S. Expl. Exped. Herp. p. 212, pl. XXII, fig. 1.9.

Sp. Ch.—Dorsal scales disposed upon fifty transverse and fourteen longitudinal series. Four unequal post-nasal plates. Preanal shields smaller than the abdominal. Tail nearly twice the length of the body and head together. Above brownish olive, with eleven brown bands across the neck and back, covering one row of scales which are tipped with white. Beneath unicolor.

Found at Fort Steilacoom by Dr. Suckley.

SCELOPORUS OCCIDENTALIS, Baird & Girard.

The Western Fence Lizard.

Sceloporus occidentalis, B. & G. Proc. Acad. Nat. Sc. Philad. VI, 1852, 175.—GIRARD, U. S. Expl. Exped. Herpetology, 383, pl. xix, fig. 8—14.

S. frontalis? B. & G. in the same works.

Sp. Ch.—Cephalic plates rugose; anterior nearly equal to the vertex plate. One or two unequal lorals; temporal scales small keeled and acuminate. Preanals moderate, rounded, sub-emarginated; post-anal small, smooth, subtruncated, sub-emarginated. Posterior surface of thighs covered with minute lanceolated and keeled scales.

Differs from *S. undulatus*, Wiegman, of the eastern States, chiefly in its larger and rougher dorsal scales, while the abdominal are smoother. The blue abdominal patches are also wider apart, and of different shape.

I first met with this little lizard on the western border of the Great Columbia plains, about 2,000 feet above the sea, on the eastern slope of the Cascade mountains. It frequented the pine trees, and did not occur on the open plain. I again met with them at the Pisuouse river, about latitude 48°, and at about the same elevation. In agility and grace, as well as in colors, it is precisely like its eastern congener. I obtained one also on the edge of the plain near Steilacoom, west of the Cascade mountains, where it is not uncommon; but I never saw it west of the Coast range, in the damper and cooler climate.—C.

Color.—Back, wood brown, tinged with greenish and ash gray, and spotted with triangular waved markings, on each side of the median line, of dark brown. At the dorsal median line these approach so nearly to each other on the opposite sides as to give, at a little distance, the appearance of waved transverse bars, extending entirely across the back. Each of these bars is bordered by a narrow margin of a greenish gray tint, resembling in color the pale mill-dew of new cheese.

Belly, white, bordered on each side by a steel blue streak 1 inch long, $\frac{1}{4}$ of an inch wide; its inner border one line in width, black. Outer border of said streak greenish blue. A patch of steel blue, divided on the throat by a narrow white line, on the median line.

Found on the edges of the prairies and in the more open portions of the forests. It appears to choose the neighborhood of rotten logs. It is quite active, running and dodging about as nimbly as a squirrel.—S.

SCELOPORUS GRACIOSUS, Baird & Girard.

The Slender Fence Lizard.

S. graciosus, B. & G. Proc. Acad. Nat. Sc. Phil. VI, Apr. 1852, p. 69.—IB. Ex. to Great Salt Lake, 1852, p. 346; pl. v, fig. 1.

S. gracilis, B. & G. Proc. Acad. Sc. Phil. 1852, p. 175.—GIRARD, Herpet. U. S. Expl. Exp. 1858, p. 386; pl. xx, fig. 1-9.

SP. CH.—Cephalic plates smooth; anterior parietal larger than vertex plate; middle occipital very large, pentagonal. Post-anal scales large, sub-lanceolate, smooth, posteriorly notched. Posterior surface of thighs covered with small, rounded, smooth scales. Olivaceous above, with a double series of crescent-shaped black spots on the back and two lateral light streaks, between which is a row of black spots. Beneath, yellowish; under surface of head clouded with bluish. Male with an elongated blue patch on each side of the abdomen.

Found at the Dalles, Oregon Territory, or at Steilacoom. At Fort Dalles they live in the cracks of the basaltic rocks, which their colors resemble in tint, being darker than those at Steilacoom. They usually emerge from their hybernation about the middle of March.—S.

CROTAPHYTUS WISLIZENII, Baird & Girard.

C. wislizenii, B. & G. Pr. Acad. Nat. Sc. Phila. VI, Apr. 1852, p. 69.—IB. Ex. to Great Salt Lake, 1852, p. 340; pl. iii.

C. gambelii, B. & G. Pr. Acad. Nat. Sc. Phila. VI, 1852, p. 126.

C. fasciatus, HALLOWELL, Pr. Acad. Nat. Sc. VI, 1852, p. 207.—IB. Sitgreaves Ex. to Zuñi, 1853, p. 115; pl. v.

SP. CH.—Head proportionately narrow and elongated. Cephalic plates and scales on the back very small. Yellowish brown, spotted all over with small patches of deep brown or black, becoming partial or complete rings on the tail.

Found at the Dalles, Oregon Territory, and up Snake river, near Fort Boisé.—S.

TAPAYA DOUGLASSII, Girard.

The Oregon Horned Toad.

Agama douglassii, BELL, Trans. Linn. Soc. London, XVI, 1833, 105; pl. x.—HARLAN, Med. & Phys. Researches, 1835, 141, fig. 3.

Phrynosoma douglassii, WAGL. Natural Syst. Amph. 1820, 146.—HOLBROOK, N. A. Herpet. II, 1842, 101; pl. xiv.—GIRARD, Stansbury's Ex. to Salt Lake, 1852, 361 and 362; pl. vii, figs. 6-10.

Tapaya douglassii, GIRARD, U. S. Expl. Exp. Herpet, 397; pl. xxi, figs. 1-5.

SP. CH.—Head large, depressed; vertex slightly declivous; snout sub-convex or rounded, sub-depressed at the nostrils. Cephalic plates moderate, very rugose, occipital and temporal spines reduced to small acerated cones. Sub-maxillary shields moderate and ridged. Auricular aperture granular, sub-tubercular, or sub-denticulated in front. Labial plates moderate. Mental scales small and unequal; gular folds minutely scaly. Abdominal scales moderate, sub-rhomboid, posteriorly obtuse. Femoral pores distant; the series from either side approximating upon the inter-femoral region without being continuous.

I obtained numerous specimens of this singular animal in the vicinity of the Yakima river, in August, and saw them as far as latitude 48° 30' north, on the open plains, usually among rocks and sand. They all had the gray color which they retain in alcohol, excepting one, which was of a brick red on the back, but beneath white, like the rest. These colors resemble those of the stones among which they live, and it is supposed by some that they have the power of changing their hue like the chameleon, and like the better known tree toad of the Atlantic States. Though ferocious in appearance they are perfectly harmless; yet the Indians believe them to have the power of producing a poisonous wound with their blunt spines, and it is possible that such a wound, *if made*, might sometimes be troublesome. They do not attempt to bite, and are so slow in motion as scarcely to get out of the way. They are, no

doubt, like the ugly but useful toads, more useful than ornamental, as their food consists chiefly of insects.

As might be supposed from the locality, the specimens found in Washington Territory are smaller than those from Oregon and Utah.

I never saw nor heard of its occurrence west of the Cascade mountains.—C.

This animal was found by me at Fort Benton, on the Upper Missouri, and again on the plains west of the Rocky mountains, as far as the Cascade range.

One was caught in September, near the Snake river, Oregon Territory. At Christmas, although having been shut up since its capture in an empty match box, it was still quite lively. When irritated it would spring in a most threatening manner at anything pointed at it, at the same time opening its mouth widely, and *audibly hissing*, after which it would inflate its body and show other evident marks of anger. It died about February 1, probably from starvation, as the heat of the house prevented torpor, and there were no insects upon which to feed it.—S.

Order III. OPHIDIA. Serpents.

CROTALUS LUCIFER, Baird and Girard.

The Western Rattlesnake.

Crotalus lucifer, BAIRD & GIRARD, Proc Acad. Sc. Phil VI, 1852, 177.—IBID Cat. N. A. Reptiles, 1853, 6.—

GIRARD, U. S. Expl. Exped. Herpetology, 187, pl. XV, figures 1 to 6.

SP. CH.—Dorsal rows of scales, twenty-five; exterior one smooth; second and third obsoletely carinated. Tail and posterior part of body with fifteen to twenty half rings. A series of dorsal hexagons or octagons, also two small irregular series on each side. A light stripe from the supra-ocular crosses the angle of the mouth on the third and fourth series of supra-labials.

A specimen of this rattlesnake shot in the Yakima valley agreed very well with the description given by Baird and Girard in their Catalogue of Reptiles. Another, however, killed about September 25, in latitude 48°, on the Columbia river, was of a pure white ground color with beautiful bright sea-green blotches on the back. It had probably just changed its skin and had not acquired its permanent brown or yellow ground color with dark brown blotches.

Rattlesnakes are much less numerous north of the Columbia than south, these two being all I met with in two months' travelling through the interior. None are found west of the Cascade range, except an occasional straggler carried down the Columbia river.—C.

Specimens vary in the ground color from white to yellowish brown. The spots vary from greenish to chestnut brown. In the young a light stripe crosses the vestae between the supra-orbital scales, and another connects it with the ash-color of the back of the head.

One specimen was killed, from the *mouth* of which three young ones were said to have escaped.

Found from the Dalles up the Columbia and Snake river. At the Dalles they are so numerous as to be very annoying, having been known to enter dwelling houses. Since the introduction of hogs in the vicinity they seem to have diminished. The Indians use the tail of the rattlesnake as a medicine to produce abortion.—S.

CROTALUS CONFLUENTUS, Say.

Prairie Rattlesnake.

PLATE XII.

Crotalus confluentus, SAY in Long's Exped. Rocky mountains, II, 1823, 28.

Crotalus confluentus, B. & G. Cat. N. A. serpents, p. 8.

SP. CH.—Head sub-triangular. Plates on top of head squamiform, irregular, angulated, and imbricated; scales between superciliaries small, numerous, uniform. Four rows of scales between the sub-orbital series (which only extends to the centre of the orbit) and the labials. Labials 15 or 18, nearly uniform. Dorsal series 27–29. Dorsal blotches quadrate, concave before and behind; intervals greater behind. Spots transversely quadrate posteriorly, ultimately becoming 10 or 12 half rings. Two transverse lines on superciliaries, enclosing about one-third. Stripe from superciliary to angle of jaws crosses angle of the mouth on the second row above labial. Rostral margined with lighter.

Milk river, Nebraska.

This species is very numerous on the Missouri river and its tributaries, between Fort Union, Nebraska, and the Rocky mountains. In July and August they are found very common in the dry cañons, and among the willow brush, and cotton-wood forests along the banks of the rivers. They are then sluggish and stupid, being, according to popular belief, “blind,” and are said to be at that season exceedingly venomous. This stupid condition during the drought of summer is not uncommon to many species of snakes, the torpidity being analogous to that of hybernation, and may therefore be called *aestivation*. Hunters have told me that the serpents are “blind,” because they are at that time about shedding the cuticle, and that as evidence of loss of vision the snake, when provoked, will “strike wildly.”—S.

EUTAINIA ATRATA, Kennicott.

SP. CH.—Body compact, cylindrical, moderately stout. Head small and narrow, eye very small; eight upper labials sixth largest. Dorsal rows of scales seventeen, exterior row largest, higher than long, and very slightly carinated; the next row smaller, but considerably larger than the third, distinctly carinated. Scales of the central dorsal rows proportionately shorter than in *E. corcinna* and *E. Pickeringii*. A very broad, deep lemon yellow dorsal stripe, covering nearly three rows, and distinct from head to tip of tail. The rest of the upper parts entirely deep blue black, without a trace of the lateral stripe or of light spots. Abdomen entirely uniform greenish slate, yellowish green under the head.—KENNICOTT.

California.—C.

EUTAINIA COOPERI, Kennicott.

PLATE XV, REPTILES, FIG. 1.

The Red Striped Garter Snake.

Eutainia cooperi, KENN. PROC. ACAD. NAT. SC. PHILAD. 1859, p. --.

SP. CH.—Body stout, compact, and cylindrical, as in *E. radix*, dorsal rows of scales only seventeen. Head short, depressed anteriorly. Labials seven above, the 5th twice as large as the 7th, being the largest of all, and greatly developed. Colors, (in alcohol,) above, uniform blackish brown, without spots, or olivaceous brown with two rows of black spots, as in *E. vagrans*, but which do not encroach upon the stripes. Dorsal stripes yellowish, distinct on one and two half rows; lateral stripe usually distinct, covering the second and part of the third rows; the row below being of the same color as the back. Abdomen usually slate color, sometimes lighter. Body frequently suffused with red, especially the dorsal stripe; abdomen sometimes tinged with red.—KENNICOTT.

The most highly colored specimens of this snake were caught in one spot, on the 2d of August, in a small prairie in the Cathlapoot'l valley. They had the colors represented in the plate, but which fade after long keeping in alcohol. Others obtained in the Willopah valley, in 1854, had dark stripes, and *young* ones were without spots.—C.

EUTAINIA PICKERINGII, Baird & Girard.

Pickering's Garter Snake.

E. pickeringii, B. & G. Cat. N. Amer. Serpents, 1853, p. 27.—GIRARD, Expl. Exped. Reptiles, p. 150, pl. XIII, fig. 14–20.

SP. CH.—Body rather slender; dorsal rows of scales nineteen, the first large and moderately carinated. Head large and high, with the upper labials well developed, seven in number, the fifth largest. Color, black above; the stripes three, greenish

or brownish yellow, (fading in alcohol.) A series of irregular vertical bars on the sides from the third to sixth rows, confluent with the lateral stripe, which covers the second and third rows. Abdomen and first dorsal rows, slate color, bluish, or greenish.

Var. *a.* Without the lateral spots, the space being black like the back.

β. Entirely black, the stripes being so narrow as to be almost obsolete; specimens showing every degree of these variations. Sides of head usually more or less mottled with brown and green, the most so in the largest specimens.

Obtained in all the western portions of the Territory, usually in or near the forests. The commonest species, but more rare, east of the Cascade range.—C.

The variety with red spots was not found by me near Puget Sound, though common at the Dalles and Vancouver.

The colors of my specimen, *when living* were as follows: In the spring, dorsal scales of a *very dark* invisible green, (almost black.) Dorsal and lateral stripes, *pea green*. Chin, *white*. Belly greenish white anteriorly, becoming posteriorly bluish white and bluish slate, and the under surface of tail "blue black."

In mid-summer the colors remain the same, except that they are darker, (deeper.) This species exists in great abundance near Steilacoom and Nisqually. They are found on the gravelly prairies and in the vicinity of the numerous small lakes of this section of country. About the first of April they begin to come out of winter quarters, and can be seen at mid-day sunning themselves near small clumps of scrub-oak bushes, to which they retreat when alarmed. A little later they are found in couples or in small companies. Although they are rarely ever found more than one-eighth of a mile from water, they are, nevertheless, still more anxious to be close to it as the season advances. They will then (in May and June) be found lying close to the water, on the lake shores in the grass, and among the sedge of the marshes, and even upon small bog islands, as much as fifty yards from the shore.

In summer, like other members of this genus, they are found lying in small pools, and in the water at the edges of the lakes, during the heat of the day. They appear to be a harmless, lazy species, and, as above stated, exceedingly fond of the water.

They rarely exceed twenty-five inches.—S.

EUTAINIA LEPTOCEPHALA, Baird & Girard.

The Small-Headed Striped Snake.

Eutainia leptcephala, B. & G. Cat. N. Amer. Serpents, 1853, p. 29.—GIRARD, Expl. Exped. Herpetology, p. 151, pl. XIII, fig. 7-13.

SP. CH.—Body rather long and slender. Head small, narrow, and flattened; not much larger than neck. Dorsal rows 19, the two exterior rows larger, the outer not carinated. Scales on most of the tail not carinated. Labials narrow; 7 above, fifth and sixth largest. Above, light olive brown, or darker, with about 130 small brown spots in two series on each side the vertebral line, occurring on alternate scales, sometimes wanting. Vertebral stripe faint, on a single row of scale; lateral stripe in young specimens partially apparent anteriorly. A blackish stripe from the post-orbital back to the angle of the mouth, sometimes touching the labials.

Found in all the western portion of the Territory.—C.

Found apparently in all parts of the Territory and in Oregon, specimens having been obtained in the St. Mary's valley by Lieutenant Mullan, and on the Snake river, near Fort Boisé, by myself.—S.

EUTAINIA VAGRANS, Baird & Girard.

The Large-headed Striped Snake.

Eutainia vagrans, B. & G., Cat. N. Amer. Herpetol., I, 1853, p. 35.—GIRARD, Expl. Exped. Herpetol., p. 154, plate xiv. figs. 5-10. (See plate XVII, Reptiles, Beckwith's P. R. R. Report, vol. X.)

SP. CH.—Body long and slender; head short, broad, and high, thicker than neck. Dorsal rows 20 or 21; stripes faint or partly wanting, with two rows of brown or black spots, about one hundred in number, on each side, confluent with the stripes. Scales of tail and outer dorsal row distinctly carinated. Labials, 8 above, the sixth and seventh largest, higher than wide. Ground color above light olive brown, the stripes paler; beneath, slate color.

Found in the Yakima valley in August, but is known to extend also west of the Cascade range.—C.

Found at Puget Sound and at Fort Boisé, on Snake river. While on Boisé river I saw a snake apparently of this species, which, upon being pursued, retreated to a small hole in the ground, the calibre of which was just sufficient to admit its occupant. Whether the hole had been excavated by the serpent, or was simply the burrow of some small rodent, I had no means of ascertaining.—S.

EUTAINIA CONCINNA, Baird & Girard.

PLATE XV, REPTILES, FIG. 2.

The One-striped Garter Snake.

Tropidonotus concinnus, HALLOW. Proc. Acad. Nat. Sc. VI, 1852, p. 182.

Eutainia concinna, B. & G. Cat. N. Amer. Serpents, 1853, p. 146.

SP. CH.—Body moderately lengthened. Head small. Dorsal rows, 21, carinated. Vertebral stripes yellow; no lateral stripes, but in their place a series of 75 salmon red spots or bars extending from the second to sixth rows of scales, and covering from half to two scales width. Ground color black, belly slate or greenish black, whitish anteriorly. Head reddish yellow, tinged with brown.

Found at Vancouver, and not observed along the coast.—S.

Were it not for the distinction in the scales of the head and back, which in this genus are relied upon as specific characters, and even decide the species into groups, these five species might be combined into two by their colors. *E. cooperii*, *leptocephala*, and *vagrans*, approach each other very closely, and *pickeringii*, especially the variety with one stripe, much resembles *concinna*; in fact, some specimens have much the appearance of being hybrids. More observations and specimens will be required to decide what characters are truly specific.

All these garter snakes have very similar habits, and are equally harmless. It is generally believed that those with carinated scales, like the three last species, are more aquatic in their habits, and I did notice this to be the case with *vagrans* and *leptocephala*; but all of them live not far from water, and in the dry season, at least, are found almost always near it. Another favorite resort is the Indian burying-grounds, where the corpses, placed above ground, attract numerous insects; and it is these, not human flesh, which forms the food of the beautiful little garter snakes, notwithstanding the association of graves and serpents so common in the minds of poets and people.

The Indians have something of the same natural (?) horror of even harmless snakes that pervades more civilized races; and it is due to the same ignorance, for they have frequently told me that snakes were poisonous which I handled with perfect impunity. Perhaps, also, superstition is connected with this antipathy.—C.

EUTAINIA HAYDENII, Kennicott. N. S.

PLATE XIV.

SP. CH.—Head broader and more depressed in front than in *E. radix*. Form stout, compact, and cylindrical, most so of the genus, except *E. radix*. Ground color light olive green, with three longitudinal yellow stripes, and six series of distinct black spots. In life some red coloring visible on the sides. Lateral stripe on the third and fourth rows less sharply defined than in *E. radix*. Dorsal rows, 21.—KENNICOTT.

Fort Pierre, Nebraska.—Dr. EVANS.

EUTAINIA FAIREYI, B. & G.

PLATE XIII, adult; XVI, young.

Eutainia Faireyi, B. & G. Cat. N. A. Serpents, p. 25.

SP. CH.—Body above deep uniform glossy black. A dorsal stripe of yellowish green one and less than two half scales wide; and one lateral stripe on each side on the third and fourth rows, usually of the same color. Sometimes the dorsal stripe is more deeply yellow than the lateral. Dorsal scales below the lateral stripe as black as above it. Abdomen greenish white. Form a little stouter than *E. saurita*. Head large. Tail rather less than one-third of the total length. Dorsal scales in nineteen rows.—KENNICOTT.

Illinois.

EUTAINIA RADIX, B. & G.

E. radix, B. & G. Cat. N. A. Serpents, p. 34.

SP. CH.—Body stout, compact, and cylindrical; tail short. Head short, narrow; nose pointed. Ground color above very dark olive brown, sometimes black, with three sharply defined, rather narrow, yellow longitudinal stripes, and six series of very indistinct black blotches which are not visible in the darker specimens. Dorsal rows, 21. Lateral stripe on the third and fourth rows.—KENNICOTT.

Fort Snelling, Minn.—S.

REGINA KIRTLANDII, Kennicott.

PLATE XX, FIG. 2.

Regina kirtlandii, KENNICOTT, Proc. Phil. Acad. Nat. Sci., 1856.

SP. CH.—Body stouter than in any other species of *Regina* or *Nerodia*; head smaller and tail shorter. Head depressed, very small, short, proportionately broad behind, continuous with the body, the neck being without any visible contraction. Crown very convex, sloping to the snout. A single nasal, with the nostril in its centre. One large ante-orbital, two large post-orbitals. Vertical, broad, sub-hexagonal. The body enlarges rapidly from the head to its full size, continuing of about the same size to near the anus, where it contracts suddenly; the tail being very small. Ground color light reddish brown, with four dorsal series of circular black spots, the two central series smallest. Abdomen uniform reddish, with a row of small black spots on each side. Dorsal rows 19, all strongly carinated.—KENNICOTT.

Illinois.

REGINA GRAHAMII, Baird and Girard.

The Prairie Water Snake.

PLATE XIX, FIG. 1.

Regina grahamii, B. & G. Catal. N. Amer. Serpents, 1853, p. 47.

SP. CH.—Dull dark brown, with a dorsal light brown line, margined on each side by a narrow indistinct black line. A broad yellowish stripe on the first, second, and third rows, margined above by an indistinct black line on the fourth and fifth rows, and below by a distinct narrow black line on the lower fourth of the first lateral row and extreme end of the abdominal scutellae. Abdomen yellowish, tinged posteriorly in the adult with olive, with a single central row of small subtriangular black spots posteriorly, which disappear on the anterior third of the body, and are sometimes obsolete in young specimens. Dorsal rows of scales, 19.—KENNICOTT.

Illinois.

SCOTOPHIS VULPINUS, Baird and Girard.

The Fox Snake.

PLATE XXII.

Scotophis vulpinus, B. & G. Catal. N. Am. Serpents, 1853, p. 75.

SP. CH.—Body stoutest of the genus; tail thick. Head large, very stout, broad, and rounded throughout. Snout short, broad; vertical plate as broad as long; superciliaries broad; loreal elevated as high as long. Eye smallest of the genus.

Dorsal rows, 25, the central distinctly carinated. Abdominal scutellae about 203. Light yellowish brown, with a dorsal and two lateral series of chocolate brown blotches. No suffusion of black in old specimens as in *S. alleghaniensis*. A frontal brown bar and a post ocular vitta; obsolete in old specimens.—KENNICOTT.

Fort Snelling, Minnesota.

A full grown specimen of this serpent was brought to me alive, at Lake Amelia, near Fort Snelling, Minnesota. When provoked it expressed its irritation by vibrating the tip of its slender tail, which, when striking a crumpled dead leaf or any other small object, would produce a well marked rattling noise, very similar to that made by the rattle snake under the same circumstances.—S.

PITUOPHIS WILKESII, Baird & Girard.

The Oregon Bull Snake.

Pituophis wilkesii, B. & G. Cat. N. A. Reptiles, I. 1853, 71.—GIRARD, U. S. Expl. Exped. Herpetology, 137; pl. ix, figs. 1-7.

Pitnuphis catenifer, B. & G.? *P. annectens*, B. & G.? op. cit.

SP. CH.—Two pairs of post frontal plates. Dorsal scales in 29 to 31 series; the three outer series smooth. Tail about a sixth of the total length. Post-ocular vitta running over the last labial to the angle of the mouth. Ground color (yellowish,) with a dorsal series of sub-quadrate, and two lateral series of sub-circular blotches.

From a large number of specimens in the Smithsonian Institution, lately examined, it appears probable that the two latter names quoted as supposed species will become synonyms, in which case *P. catenifer* will be the name of the species. The Californian specimens, on which they were founded, differ chiefly in the proportions of the cephalic scales, and the size of their spots, which are largest in *catenifer*.

A specimen caught in the Yakima valley, on August 28th, differed from the description above given only in the ground color, which was pale gray instead of yellowish, a tint doubtless caused by the alcohol.

This large snake, sometimes three or four feet long, is like the others of the genus commonly called "Bull" and "Pine snake," quite harmless, and must destroy a great many mice, gophers, and other vermin. Not found west of the coast range.—C.

The ground color gray, sometimes tinted with brownish or yellowish. Spots brown, most dark posteriorly, sometimes margined with black. Ground color of belly yellow; spots black. Found sparingly at Puget Sound, but common at the Dalles and up Snake river to Fort Boisé. It is, in fact, mostly confined to the open country. The length of the adult rarely exceeds three feet.—S.

PITUOPHIS SAYI, Baird & Girard.

Prairie Bull Snake.

PLATE XXII.

Coluber sayi, SCHLEGEL, (non Holbr.)—Essai Phys. Serp. Part. descr. 1837, 157.

"*Coluber melanoleucus*, var. SAY."—HARL. Jour. Acad. Sc. Philad. V, 1827, 360.—IB. Med. and Phys. Researches, 1835, 123.

Pituophis sayi, B. & G. Catal. N. Am. Serpents, 1853, p. 152, (under *Coluber sayi*.)

SP. CH.—Head proportionately small, crown rounded throughout, snout very pointed. Rostral very narrow, projecting, the apex elongated and pointed, extending far back between the prefrontals. Verticals short, broad, nearly as wide anteriorly as long. Nasals and loreal large. One ante-orbital, rarely two; three post-orbitals, rarely four. Dorsal scales shorter and more rounded than in *P. bellona*. Ground color whitish or reddish yellow, a dorsal series of sub-quadrangular blotches, with 3 or 4

small series on each side, the blotches brown on the middle of the body, black towards the head and tail. Abdomen yellowish white, with an external series of rather large black spots on each side, inside of which are two irregular series of wavy black blotches. Head much spotted with black and labials heavily margined with the same. A pitch black post-ocular with a frontal band, and sub-orbital vertical bar.—KENNICOTT.

The prairie bull snake is very numerous in eastern Minnesota, where I obtained many specimens. They are said to be occasionally ploughed up by the settlers when breaking the prairie sod.

During the rutting season they seem to follow each other by the scent, as I noticed upon one occasion that having captured a fine living individual, and placed it with others in a barre near my tent, a very large snake of the same species was found a short time after but a short distance from my reptile prison, being on its way in a direct line from the locality whence the other had just been brought.

A nearly similar action was observed with another species. The facts might have been simply accidental, although if so, seemed strangely to confirm the popular belief on the subject. Whether the mates of these and other species do follow each other by the scent is well worthy of future investigation. The fact seemed so impressed on the minds of my companions that the naturalist's tent was for a time *tabooed*.

A very large *Pituophis* was collected by me in Nebraska. Its colors were considerably darker than those of the Minnesota specimens. The length of the skin, stretched somewhat in taking off, was eighty-seven inches.—S.

BASCANION VETUSTUS, Baird & Girard.

The Green Racer.

PLATE XX, FIG. 1.

Bascanion vetustus, B. & G. Catal. N. A. Reptiles, I, 1853, 97.—GIRARD, U. S. Expl. Exped. Herpet. 127. Pl. VIII, figs. 12—19.

SP. CH.—Width of head equal to half its length, taking the greatest dimensions. Inferior post-orbital in a notch between the fourth and fifth labials. Colors, when fresh, pale green above, straw yellow beneath, sometimes varying to brownish above.

Three specimens of this handsome snake were caught in or near the Yakima valley, in August, 1853. Like its relative, the black snake of the Atlantic States, it is perfectly harmless, and does not even bite usually when handled. It runs with great rapidity, and the popular name given both to this and to the allied, if not identical, *B. flaviventris*, of Nebraska and Kansas, is very appropriate. Not found west of the Coast range.—C.

A specimen caught August 8, at Fort Steilacoom, had the following colors when fresh: *Upper parts of a uniform brownish slate color.* Edges of scales blackish. Skin colored the same as the central portions of the scales. Belly bluish white, with a tinge of yellow anteriorly and under the chin. Caudal scutella much darker than those of the middle.

Specimens from the Dalles partake of the characters of *B. flaviventris*, and are of a pale olive, becoming brown posteriorly, sides bluish. Young specimens are ash-colored above, with chestnut spots; head olive and spotted. Beneath pale greenish yellow, with small reddish brown spots anteriorly. In older ones the blotches of the back become confluent and finally unicolor.

It has the same habit of climbing in bushes common to the black snake of the eastern States. Found sparingly at Puget Sound.—S.

MASTICOPHIS TÆNIATUS, Baird & Girard.

The Californian Whip Snake.

Leptophis tæniata, HALLOWELL, Proc. Acad. Nat. Sc. Phil. VI, 1852, p. 181.

Masticophis tæniatus, B. & G. Catal. N. Am. Rep. 1853, p. 103.—BAIRD, P. R. R. Rep. Vol. X, (Beckwith's Exp.) Pl. XXIII.

SP. CH.—Dorsal rows 15, tail about one-third of the total length. A broad brown dorsal stripe margined by a darker line. The four outer rows of scales on each side yellow, with a darker line through the centre of each. A dark line along the edge of the abdomen, making six dark lines on each side. Beneath yellowish.

A young specimen of this species was obtained on Snake river, Oregon Territory. Nothing regarding its habits was observed.—S.

DIADOPHIS PULCHELLUS, Baird & Girard.

The Western Ring Snake.

Diadophis pulchellus, B. & G. Cat. N. Am. Serpents, 1855, p. 115.

SP. CH.—Dorsal scales in fifteen rows; occipital ring broad; colors, (in alc.) above uniform dark greenish brown, beneath orange with small black spots irregularly scattered both above and below from head to tail, sometimes wanting. Color of abdomen extending on to lateral dorsal scales.

A living specimen had the following colors: Top of head glossy, of a dark brownish olive with a bluish tinge, several of the plates being indistinctly spotted with black. Occipital ring deep reddish orange, having a diagonal width of three scales. A band along the back eleven scales wide of a slaty brown, rather pale, and with a slight greenish tinge anteriorly; posteriorly it becomes more bluish, losing its greenish cast and narrowing on the tail from 9 to 2 scales in width. Chin, belly, and first two rows of dorsal scales bright, fiery orange. This color deepens posteriorly, becoming more red, the sub-caudal scutella being almost the color of red sealing-wax. A row of black spots on each side, each spot being on the posterior edge of the first row of dorsal scales. The abdominal scutellæ have two well marked rows of small black spots besides several other partial or irregular rows. All these spots are found on the posterior edges of the scales.

The occipital ring is margined posteriorly by a series of black spots, showing an apparent attempt in nature to form a black linear margin.

This is the only specimen of the genus or the species that I have seen west of the Rocky mountains. The natives do not say that it is abundant, and the white settlers have only occasionally observed it. Fort Dalles, Oregon Territory, May, 1855.—S.

CELUTA AMÆNA, B. & G.

PLATE XIX, FIG. 2.

Ground Snake; Worm Snake.

Celuta Amæna, B. & G. Cat. N. A. Serpents, 1853, p. 129.

Coluber amænus, SAY, Journ. Acad. Nat. Sc. Philad. IV, 1825, 237.—HARL. Journ. Acad. Nat. Sc. Philad. V, 1827, 355; and Med. & Phys. Res. 1835, 118.—STORER, Rep. Rept. Mass. 1839, 226.

Calamaria amæna, SCHL. Ess. Phys. Serp. Part. descr. 1837, 31. Pl. i, figs. 19 and 20.

Brachyorrhos amæus, HOLBR. N. Amer. Herp. III, 1842, 115. Pl. xxvii.

SP. CH.—Above uniform chestnut brown, opalescent; light yellow (bright salmon-color in life) beneath. Dorsal scales in 13 rows.

Western Missouri.

WENONA PLUMBEA, Baird & Girard.

The Brown Wood Snake.

Wenona plumbea, B. & G. *Wenona isabella*? B. & G. Proc. Acad. Sc. Philad. VI, 1852, 176; *Ibid.* Catal. N. A. Reptiles, I, 1853, 139, 140.—GIRARD, U. S. Expl. Exp. Herpet. 1858, 112, 113, pl. VII, f. 1-14.

The distinctness of the above supposed two species is uncertain from the small number of specimens examined. They differ in the frontal plates and in the orbitals, but their colors are described as nearly the same, *plumbea* being lead color above, and *isabella* light brown; both yellow beneath, the latter more dull.

Not very uncommon at Puget Sound. Specimens appear to unite the characters of the species described by Baird and Girard.—S.

The short, thick, and clumsy form of these snakes, with their small pointed head covered with scales like those of the back; very small eye and mouth; numerous small smooth scales, and blunt tail, at once distinguish them, though in color they much resemble the "green racer," heretofore described, when in its old skin, before changing it in July.

About June 1, 1855, I obtained a large specimen of the above snake under the loose bark of a log, where it seemed to have crawled to escape from the light. It appeared dazzled, and did not attempt either to escape or to bite. This snake, though unpleasant in appearance, is perfectly harmless, and, like most others, useful in destroying insects and mice. It is the nearest representative of the *boa constrictor* in the United States, but little is known of its habits.—C.

Order IV. BATRACHIA. Soft Skinned Reptiles.

Tribe I.—Anoura.—Tailless Batrachians.

BUFO BOREAS, Baird & Girard.

Bufo boreas, B. & G. Expl. Exped. Herpet. p. 74, pl. VI, fig. 4-9.

Sp. Ch.—Upper surface of head plane; skin not adhering to the skull, and smooth; green, with a dorsal yellow vitta; pustules reddish; beneath of a soiled white, maculated with black.

Distinguished from *B. columbiensis* by having the fore arm longer than the hand or arm, both pairs of legs longer, and hind foot proportionately longer, and the soles nearly smooth. The bright colors above described are those of the young. When alive the colors vary in shade, but are similar in pattern in all examined. That best marked has the back olive brown, darker posteriorly; tubercles dark brown; spots on legs nearly black, both surrounded by a narrow edging of straw yellow, becoming greenish, and mixed with the brown on the sides. The dorsal stripe is bright yellow, (wanting in some specimens;) angles of mouth and inner sides of thighs yellow also; belly pale brownish white, with black spots posteriorly; iris rich gold color, veined with black; canthi black. Another specimen had a brown circle around iris, and green lids.

This toad is abundant west of the Cascade mountains, and has habits similar to those of most other true toads, hopping about at dusk after its insect prey; and, although disagreeable to many persons, is perfectly harmless and very useful.—C.

BUFO COLUMBIENSIS, Baird & Girard.

The Columbia Toad.

Bufo columbiensis, B. & G. Proc. Acad. Nat. Sci. Philad. VI, 1853, 378.—GIRARD, Proc. Acad. Sc. VII, 1854, 87.—

IBID. U. S. Expl. Exped. Herpet. 77, pl. V, figs. 4—9.

SP. CH.—Upper surface of head plane; skin adhering to the skull and granulated. Parotids and tympanum small. A membranous tarsal fold; toes palmated. A dorsal white vitta and an oblique dark patch beneath the eye.

Found in Washington Territory west of the Cascade mountains. Nothing distinctive was noticed in its habits.—C.

RANA PRETIOSA, Baird & Girard.

The Salmon Frog.

Rana pretiosa, B. & G. Proc. Acad. Sc. Phil. VI, 1853, 378.—IB. U. S. Expl. Exped. Herpetology, 21, 1858; pl. II, figs. 13—18

SP. CH.—Tympanum rather small. Hands smooth. Feet granulated underneath, fingers slender and tapering; toes webbed, terminal joint of longest free. A small flattened horny process at the base of the inner toe and a minute conical tubercle between the fourth and fifth. Two depressed dorsal series of pores, one on each side; a glandular ridge along the upper jaw.

When living the colors in full grown specimens are: nose and cheek pea-green tinged with gold; a stripe of the same hue down each side of the back. Remainder of back from eyes to tail reddish brown, with a black streak. Legs paler with transverse black bars. Flanks and inner sides of thighs salmon red, growing darker towards feet. Belly white, sometimes with brick-red spots; thighs posteriorly and sides spotted with white. A wood brown stripe on each side of head; lips tinged with gold color. Size of body from two to three inches long.

Younger specimens pale green above; thighs pale brown; no reddish tints beneath, white spots larger and more numerous.

I found frogs nowhere common in the Territory. The specimens described above were found about springs near Shoalwater bay, and when alive are very beautiful and interesting little animals.

RANA HALECINA.

The Spotted Frog.

PLATE XXIX, fig. 7.

Although the distance of locality, which gives the species a wider range than any other reptile of the Atlantic coast, would *a priori* indicate distinctness of species, a careful comparison by Professor Baird does not show any tangible points of difference. Specimens of this frog were collected at Fort Dalles.—S.

HYLA REGILLA, Baird & Girard.

The Oregon Wood-Frog.

Hyla regilla, B. & G. Proc. Acad. Nat. Sc. Phila. VI, 1852, 174; and 1853, 301.—IBID. U. S. Expl. Exp. Herpet. 60, pl. III, figs. 13—18.

Hyla scapularis, HALLOWELL, Proc. Acad. Sc. VI, 1852, 183.

SP. CH.—Vomerine teeth disposed upon two circular groups. Fingers free, toes semi-palmated. Skin above tuberculous, beneath glandulous. Green, with orange reflections, sometimes maculated or banded with blackish brown.

This brilliant little wood-frog abounds in some localities and at some seasons, but at others is rarely met with, as it seems to seek the high trees. In September I found vast numbers of

them around a spring on the high mountain spur between the Yakima and Columbia rivers, over 4,000 feet above the sea, and also obtained a few at Chequass, in the Klickitat Pass, at the same elevation. I was inclined to think that the great dryness of the summer east of the Cascade range had driven them from the trees to seek for water. I found them also, but rarely, at Shoalwater bay, where they seem to leave the trees less often. Those which have brown markings are much larger than the others, and not so frequently found.

The shrill "peep" of this frog is often heard, but it is difficult to see the performer in its shelter among the green leaves.—C.

Specimens of this beautiful little tree toad, caught April 3, 1855, had the ground color of upper parts pale green, mottled by small irregular patches of a slightly deeper shade, which are bordered by streaks of black. Inside of thighs and legs of a yellowish flesh color. Black streak from the shoulder to the end of the nose, passing through the centre of the eyes. Caught in a dry situation on the upland near Fort Dalles. It is found at a considerable distance from water or trees. It is fond of clinging to rocks, but otherwise had the habits of a tree toad.—S.

Tribe II.—*Uradela*.—Tailed Batrachians.

TARICHA TOROSA, Gray.

The Warty Salamander.

Triton torosus, ESCH. Zool. Atl. V, 1833, 12 Taf. xxi, fig. 15.

Triton ermani, WIEGM. in Erman's Reise um die Erde, 1835, and Arch. fur Naturg, 1836, II, 250.

Salamandra beecheyi, GRAY; Beechey's voyage, Zool. 1839, 99.

Triton granulosus, SKILTON, Amer. Journ. Sc. VII, 1849, 202; pl. figs. 4 and 5.

Notophthalmus torosus, BAIRD, Journ. Acad. Nat. Sc. Philad., I, 1850, p. 284.

Pleurodeles californiae, BIBB. Mus. Zool. Soc. (Gray.)

Taricha torosa, GRAY, Catal. Amph. Brit. Mus. II, 1850, p. 25.—GIRARD, U. S. Expl. Exped. Hesperology, 1858, p. 5, figs. 1-8.

SP. CH.—Tail longer than the head and body together, compressed, provided with a slightly elevated membranous keel upon its upper and lower edges. Tip of toes callous; inner toes in both pair of limbs very small. Skin granular. Color, rich dark brown above, with minute pale dots; sides and beneath, orange or yellow; iris, gold color.

This salamander is usually found during the day crawling slowly about the woods, often at a considerable distance from the water. They are so slow and stupid as never to attempt to get out of the way, and seem, therefore, to be soon exterminated where hogs are allowed to range in the woods. I found them far most abundant in the damp spruce forests near the coast, but have also found them everywhere as far east as the summits of the Cascade mountains, where, at a height of over 4,000 feet above the sea, I obtained the first full grown specimen met with, on August 5, 1853. This one, as if to verify the popular fable of the salamander, was caught while leisurely crawling through the ashes of our camp fire, no doubt driven out of the ground by the heat. I have met with this animal crawling about in January and February, but in severe weather it hybernates in the mud at the bottom of ponds, where, if shallow, it sometimes is killed by freezing, as I have found a large number dead in this way. In March and April they seek the water to spawn, and their loud piping may then be heard at night, everywhere, though they are silent at other seasons. In May their spawn is found attached to twigs in the water, after which time they seek the land again. I found young ones about two inches long in July, which were entirely aquatic, and had external branchiae or gills, but in color were exactly like the adult animal. When in the water this is a very

active animal, and has a greater expansion of the thin membrane of its tail than during its terrestrial life.

The spawn mentioned as deposited by this species in the water may have belonged to some other animal, as most salamanders are believed to deposit it on land, under stones, &c.; but I never found any in such situations.

NOTE.—Both Mr. Gibbs and myself found near Steilacoom a small kind of salamander under logs and stones, which seems to be undescribed. The specimens were, in some way, lost or destroyed. When alive, they were pale purplish, with yellow longitudinal stripes.—C.

Among the lost collections from the Dalles was a small salamander, found in January, 1855, which had the sides deep blue, with light markings; belly spotted with black. No such species is known to naturalists.—S.

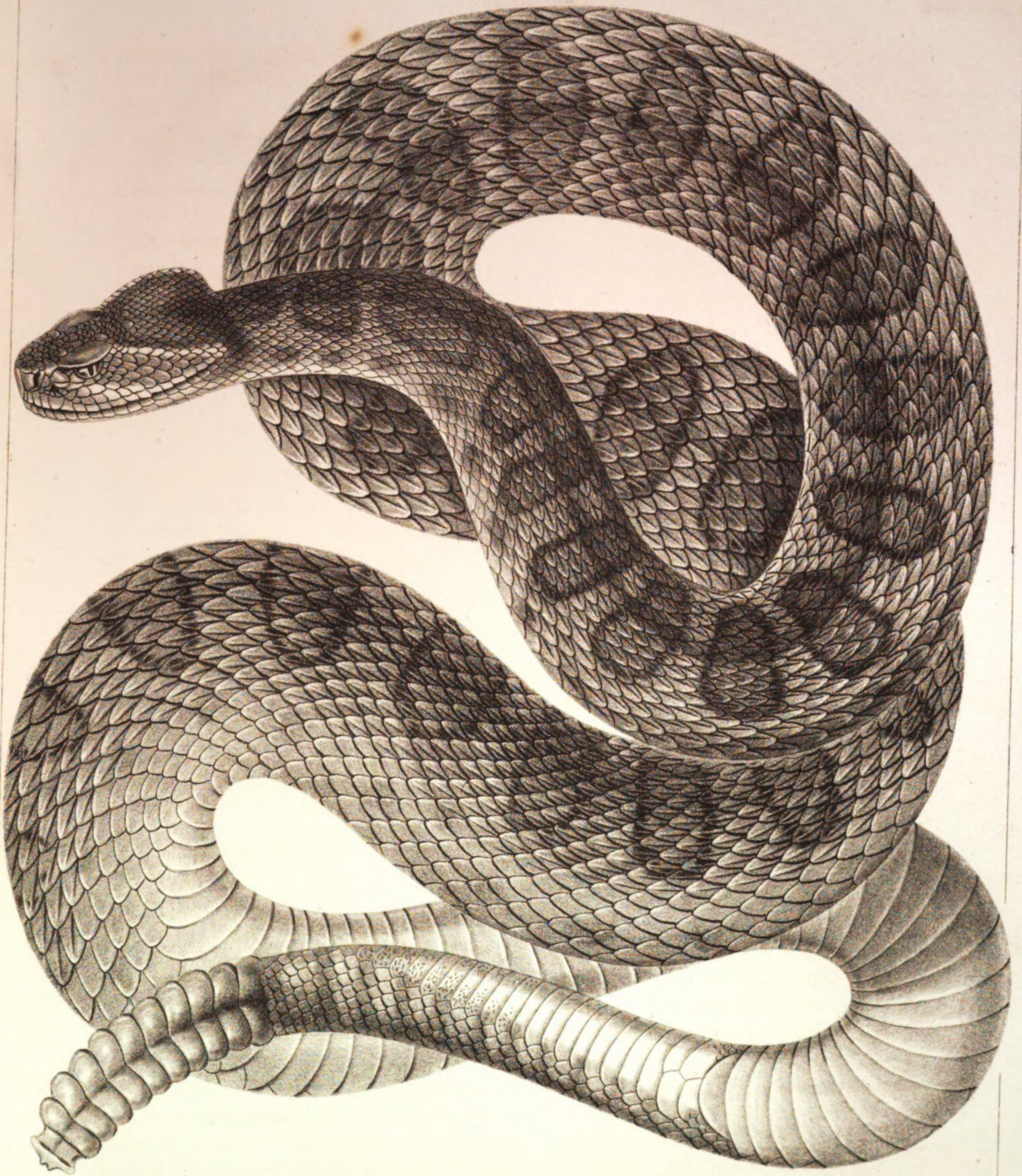
SIREDON LICHENOIDES,? Baird.

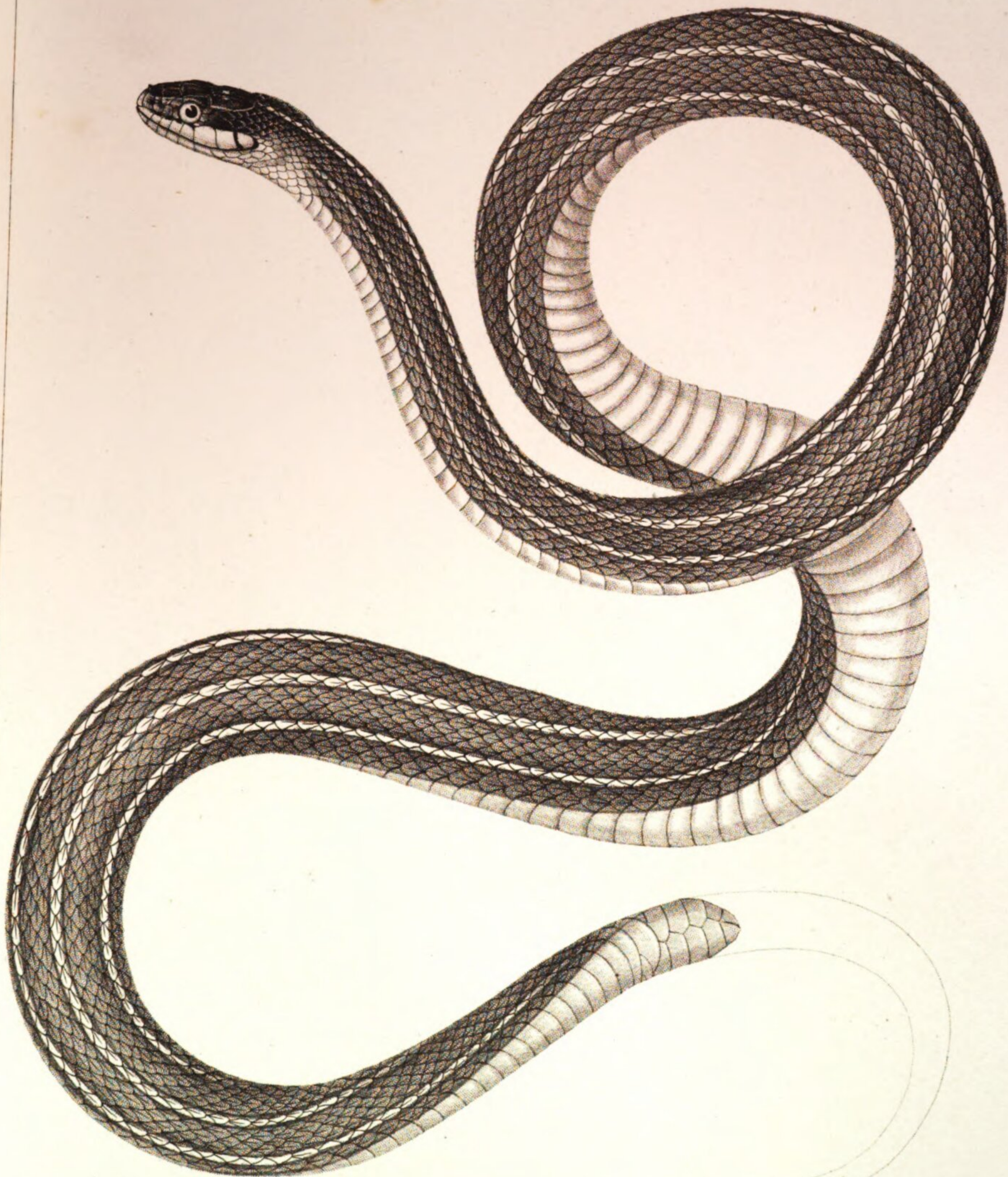
“Ground Puppy;” “Four-legged Fish.”

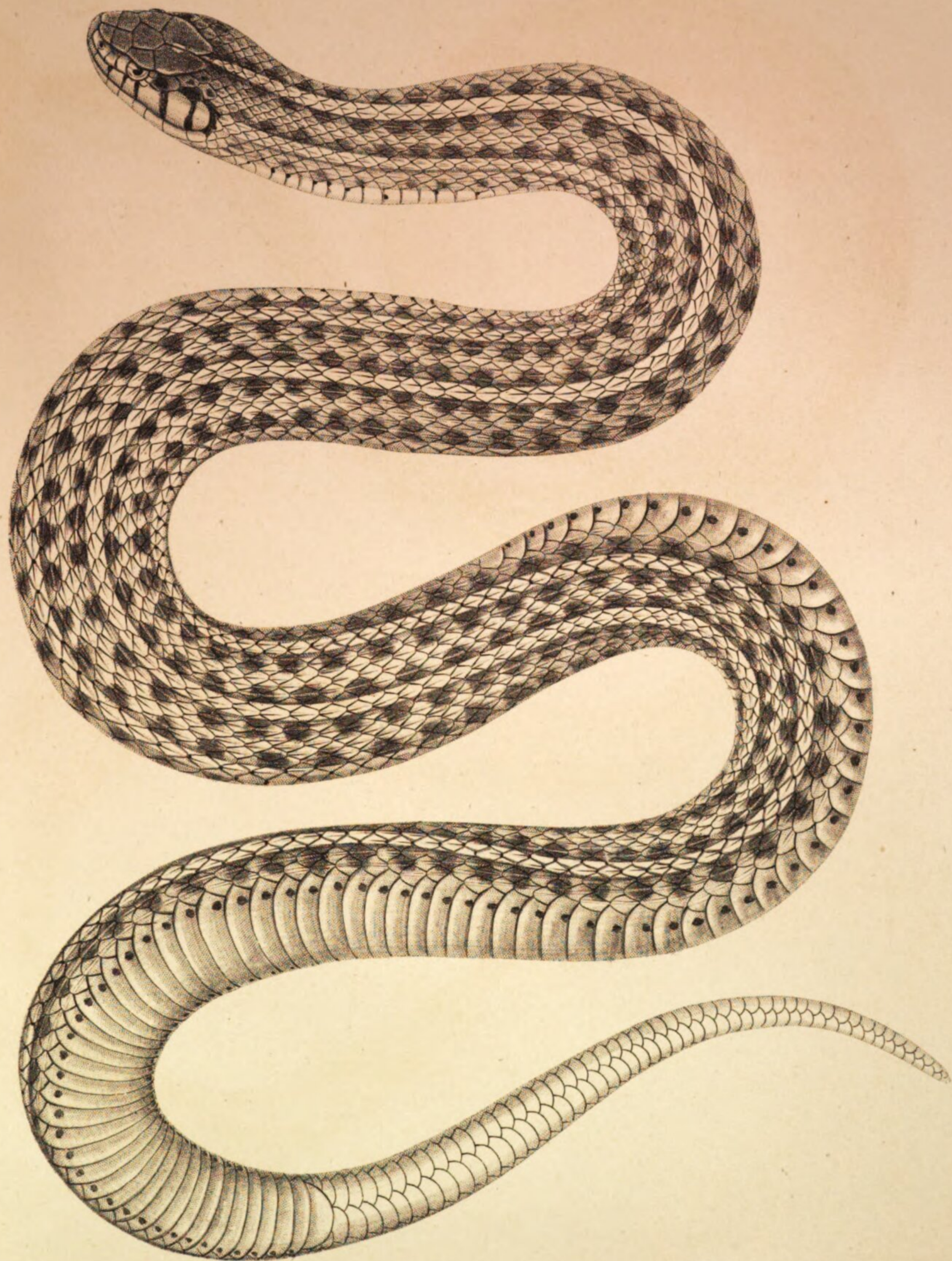
Siredon lichenoides,? BAIRD, Stansb. Salt Lake Exp. 1852, p. 336, pl. 1.

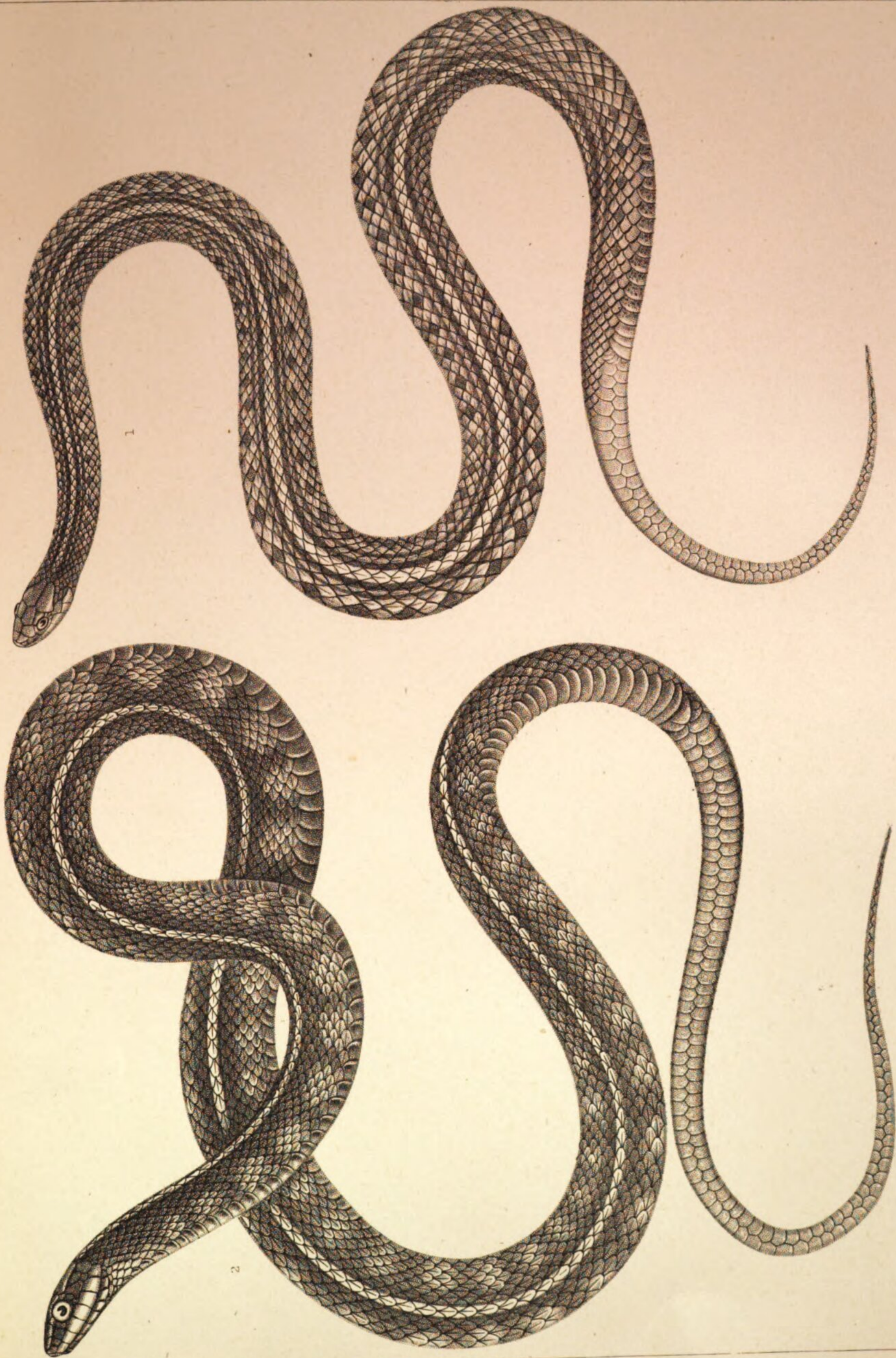
A specimen of siredon collected by Dr. Suckley, near Fort Union, Nebraska, differs from the typical *S. lichenoides*, in fuller form, and in the presence of distinct rounded black spots on a grayish brown ground, the spots larger and more distinct than in *S. mexicanus*; the eyes are more anterior. In the absence of tangible, distinctive characters, it is difficult to say if this animal be really distinct from *lichenoides*; but it may, at any rate, be considered as a well marked variety, *S. melanosticta*. The total length of the specimen, No. 4073, is about nine inches.—BAIRD.

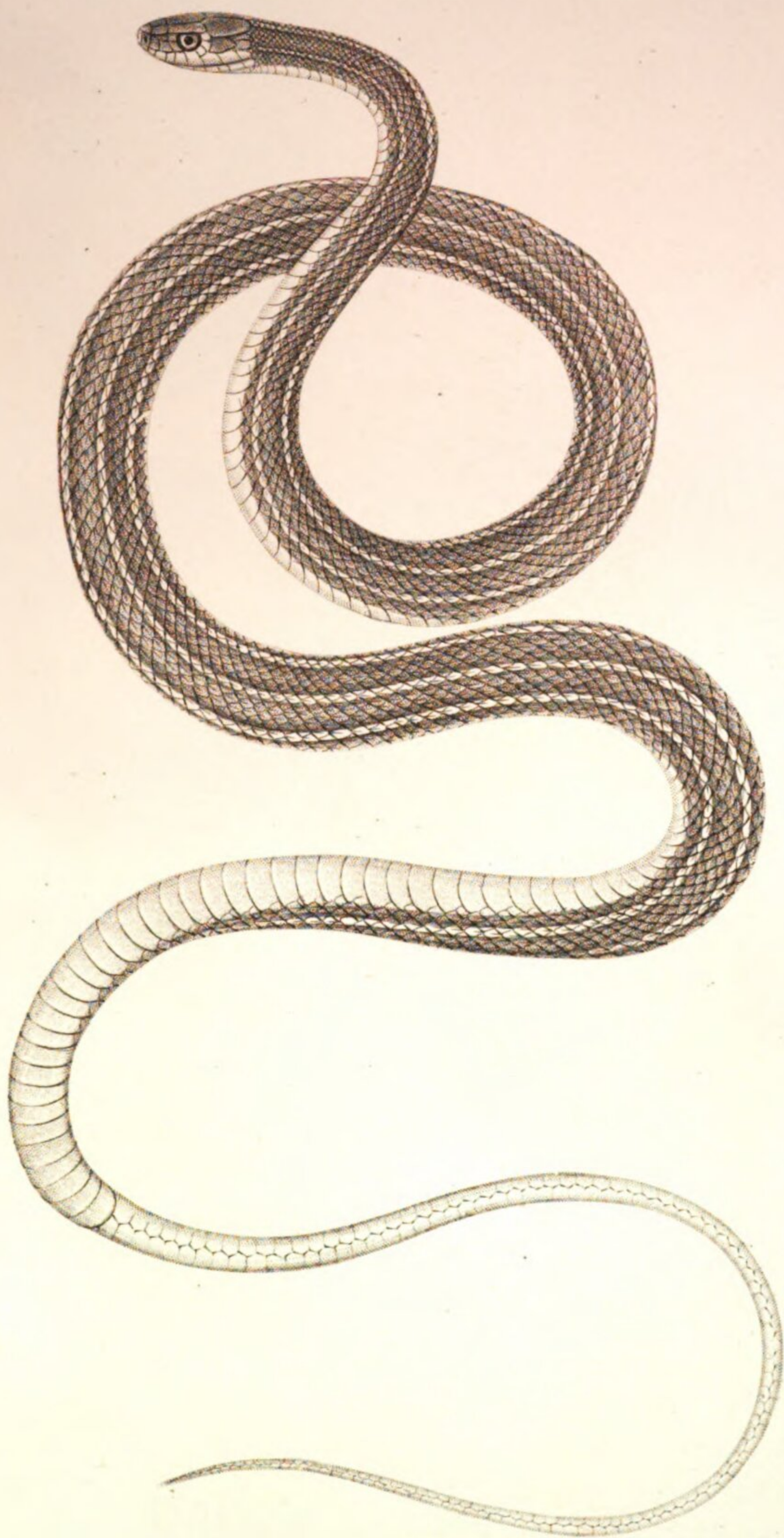
This siredon was obtained on the route between Fort Union and Fort Benton, Nebraska. Vast numbers of a species apparently identical are found in the small brackish lakes of central Minnesota, where I procured some thirty or forty specimens, which were, unfortunately, afterwards lost on their way to Washington city. The species is, apparently, permanently aquatic; the only occasion upon which I noticed them out of their native ponds was when, during a terrific thunder shower, I found many in the wet grass within a few feet of a small prairie lake, to which they had retreated from the water, apparently from fright produced by the loud claps of thunder. I generally obtained them by dragging a seine through the small, shallow, muddy ponds, so numerous in that region. The contents of my net were generally confined to those animals, and vast numbers of aquatic insects.—S.

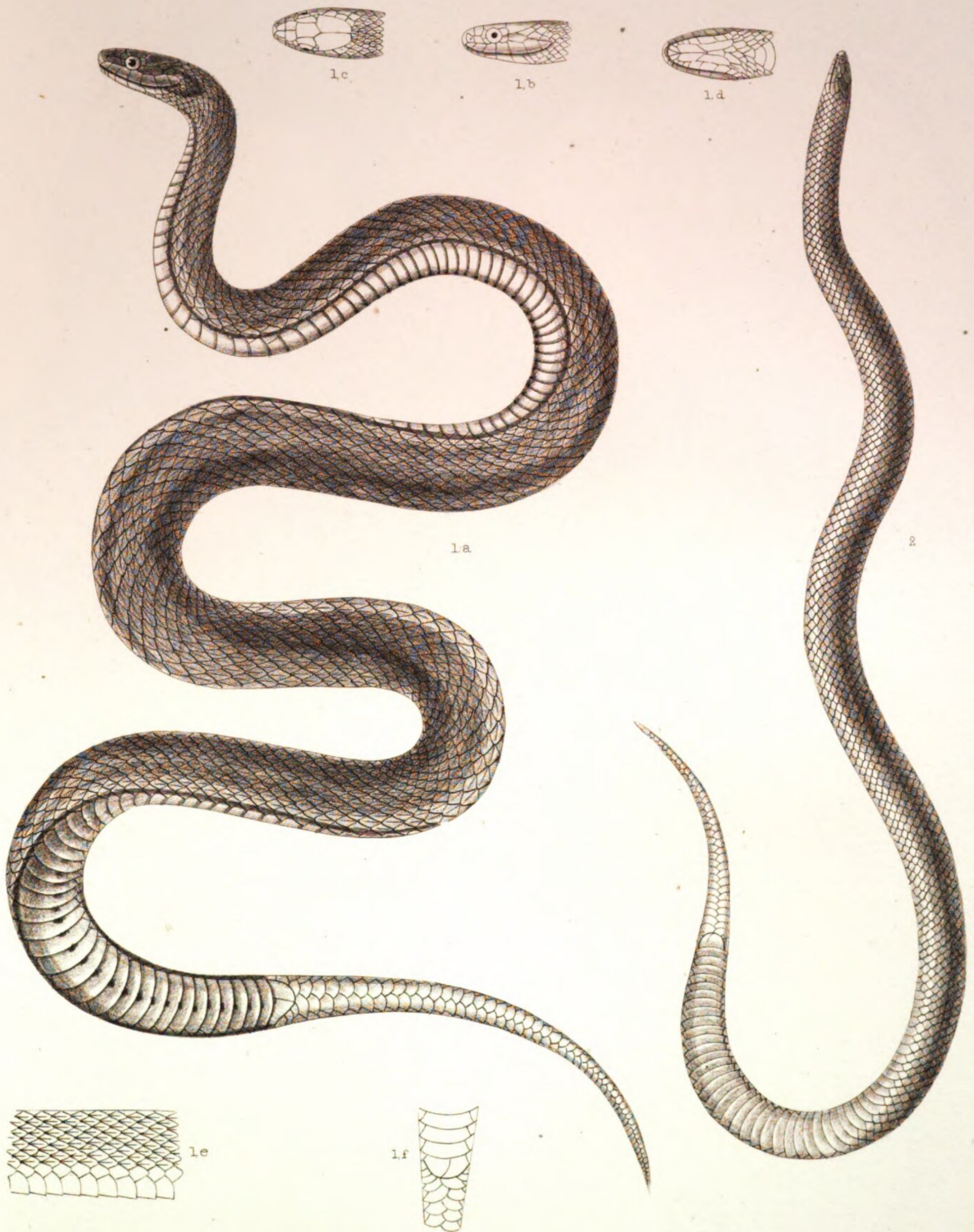




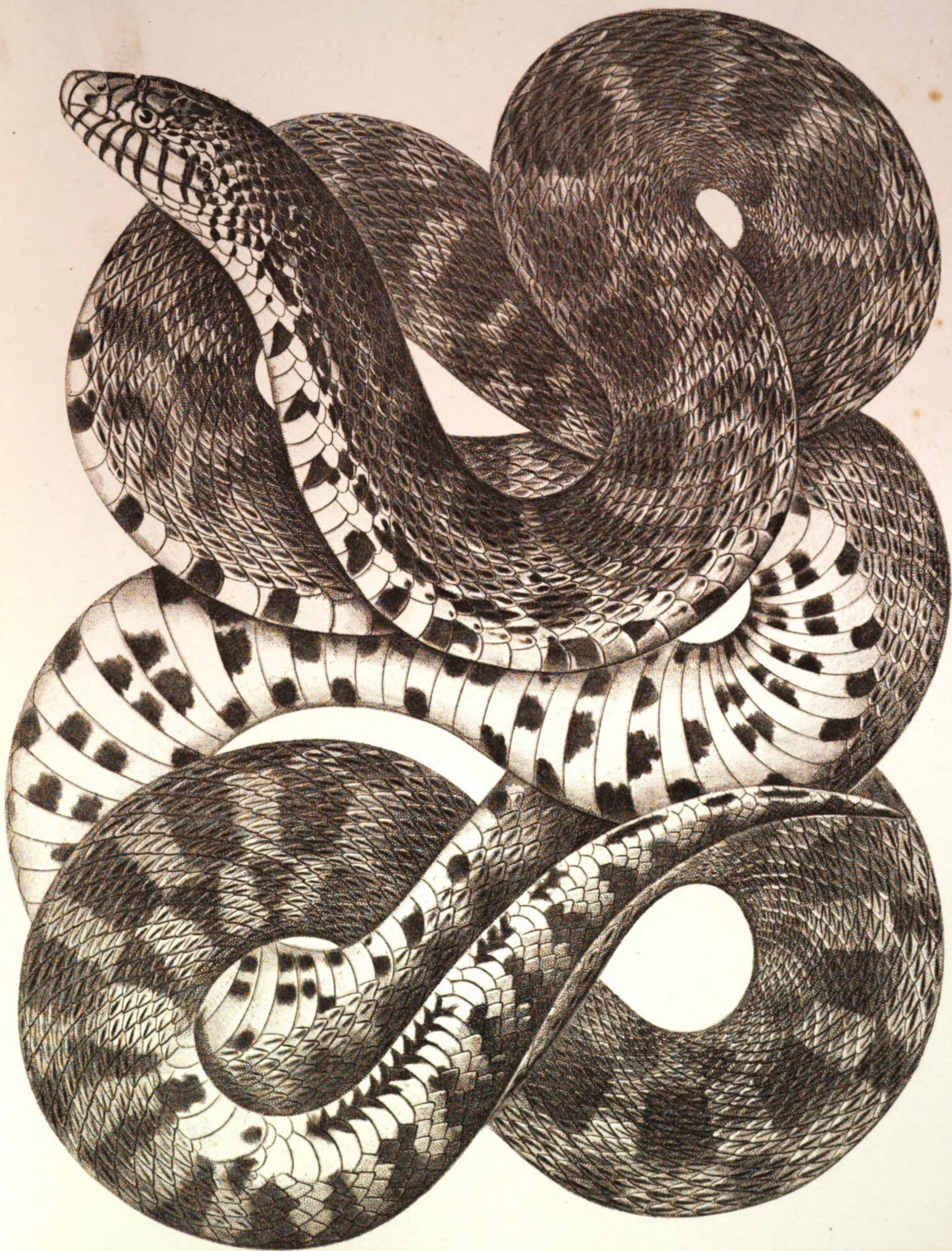


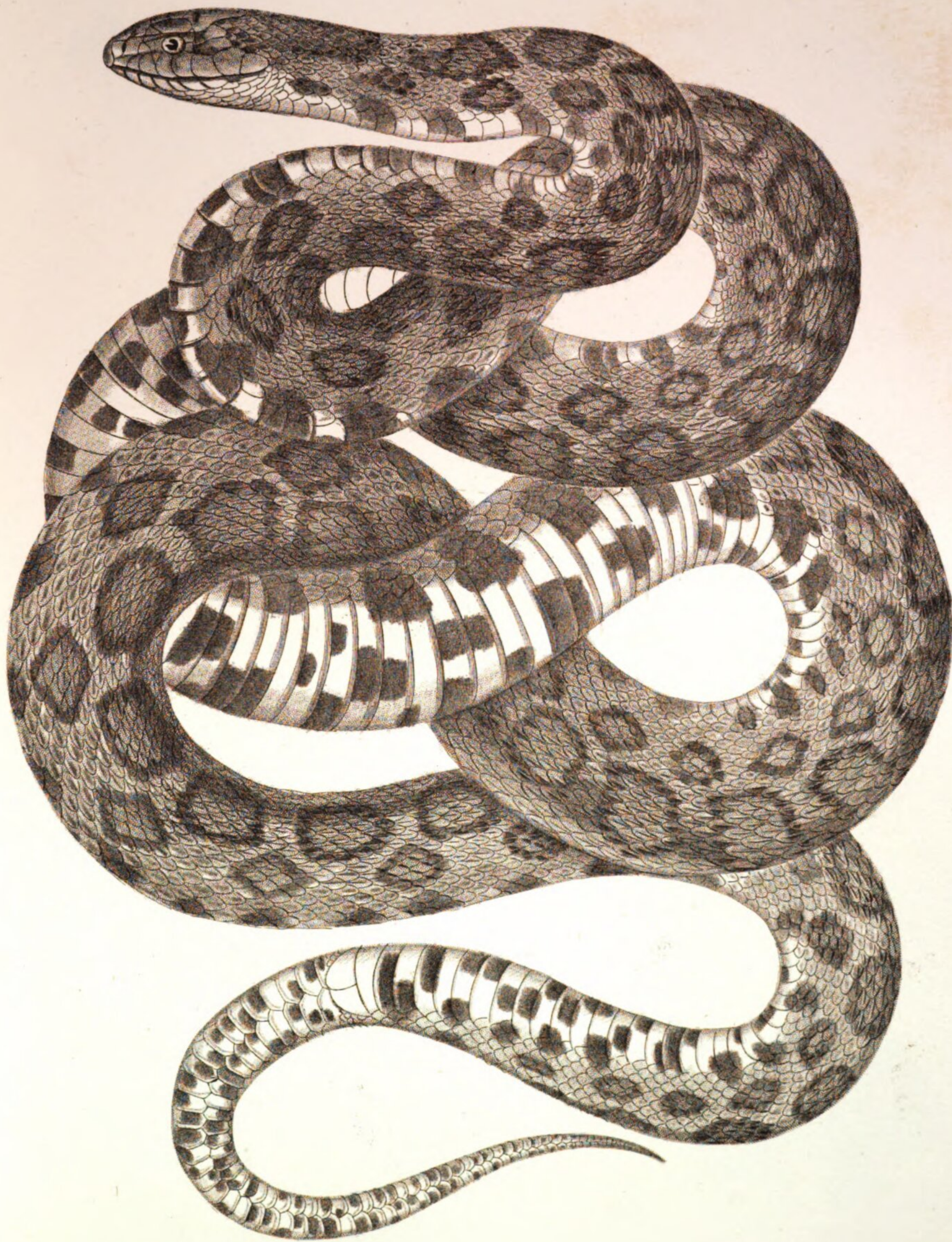
















No. 5.

REPORT UPON THE FISHES COLLECTED ON THE SURVEY.

BY DR. G. SUCKLEY, U. S. A.

CHAPTER I.

REPORT UPON THE SALMONIDAE.

As the *salmon* family holds the strongest position in economical importance among the fishes of the northwest, the first portion of this report is devoted to the consideration of that group. The second division contains brief descriptions and notes of the other kinds of fishes found along the line of the survey. Those obtained east of the Rocky mountains are simply alluded to by the names given in the General Report on Fishes, vol. 10 Pacific Railroad Reports, with reference to the pages in which descriptions more in detail can be found. The fishes obtained from the region west of those mountains have brief scientific descriptions added, in order that they may be readily identified by students or future explorers in those Territories. This was deemed necessary on account of the great confusion existing among settlers regarding the common names applied to the fish, many of which, although widely distinct from each other, are known by the same names to different persons.

The notes and memoranda furnished by Dr. James G. Cooper, surgeon and naturalist to the western division of the survey, have been incorporated over his initials. Credit is given in their appropriate connexions for information derived from other persons.

The fisheries of Washington Territory will, at an early day, be considered of great importance to our commerce. - The various kinds of salmon form the bulk of the valuable fishes there found, but there are, in addition, many others which, although not so numerous, are yet abundant and of fair relative commercial value. Among these are the *cod*, found in moderate quantity in Puget Sound, and said to be very abundant on a deep bar or bank, off the mouth of the Straits of Fuca; the *halibut*, found in the same situations; the *eulachon*, a very delicious fish, in some years coming in great shoals in the bays of the lower part of Puget Sound, and along the coast near the mouth of Frazer's river; the *herring*, arriving in vast quantities in the same waters at regular periods, besides a vast number of good table fish, such as sole, flounders, the so-called "rock-cod," viviparous perch, &c., &c., which, although not valuable for trade, are useful additions to the fare of the inhabitants.*

Several points on the Columbia river are most excellent locations for the taking of salmon and the establishment of "packing" houses. These are generally at the greater falls and rapids. The best fish are there taken in the spring and early summer months. Salmon of

* A trade in oysters has long been carried on between Shoalwater bay and San Francisco, and will, if properly conducted, undoubtedly prove profitable.

different kinds are taken at other seasons. The species of salmon which is principally used for salting in Puget Sound is the *Skowitz*, an autumnal visitor. Of these, Messrs. Riley & Swan, proprietors of the salmon packing establishment at the mouth of the Puyallup river, have taken 3,000 at one haul of a seine! The average weight of the species cannot be said to exceed twelve pounds, and is perhaps not greater than eight or ten. This size is very convenient for packing.

This subject is more fully discussed in the pages devoted to the special consideration of the *Salmonidae*.

1. *Descriptions and history of the various species of fish belonging to the salmon family, found in the waters of Oregon and Washington Territories.*

GENERAL REMARKS.—In the preparation of the following pages it has been attempted to collate from various sources all the useful facts known concerning the natural history and economic value of those species of the salmon group existing in the waters of our extreme northwestern Territories. Considerable additional information concerning the species recently described, drawn from the accounts of explorers, settlers, Indians, and others, has also been embodied.

In the scientific determination of the different species, we have been fully aware of the difficulties and perplexities that surround the subject, and accordingly do not flatter ourselves that perfection has been arrived at, but simply offer the report as a stepping-stone to future knowledge.

Owing to the paucity of the material at present furnished by the specimens of this particular group contained in the national collection, the arrangement of different species of the family under the special generic divisions *Fario* and *Salar* has not been adhered to, but all the species have been temporarily retained under the genus *Salmo*. To separate the species we have into genera, from the distinctions afforded by the number and arrangement of the vomerine teeth and other anatomical characteristics, under the present circumstances, would be rash, and the classification thus furnished unreliable.

It is hoped that at some future day, when the different kinds are better known and have been more thoroughly studied, that a sound classification may be founded on the anatomical characters of *healthy, fresh-run adults*. Too much confusion has been occasioned already by the description of new species founded on *immature, ill-conditioned, or abnormal* specimens, and by new genera and sub-genera based on the arrangement of such diverse and unsound material.

Quite abundant as far south as San Francisco, we find these fish, as we proceed north, increasing in species and in numbers, until, in arriving at the Columbia river, and at the rivers near Vancouver's Island or the streams falling into Puget Sound, they form one of the most striking wonders of the region. Their vast numbers of these fish, differing in anatomical peculiarities, species, and color, and changing much with age, sex, and condition, season of the year, or quality of the water, astonish by their number, and confuse with their variety.

From the vague and ill-determined characters separating the different species of *Salmonidae*, many of which, although obviously distinct from each other, yet approach in so many characters disagreeing only in shade and intensity, it is found extremely difficult to give a concise and striking summary of the leading characters of certain species, so that, by reading a short synopsis, an ordinary observer may readily define the position of a particular specimen. When, in addition to the difficulties found in identifying good typical specimens of the *healthy, fresh-run adults*, are added the perplexities caused by changes in age, sex, and condition, "confusion

becomes the worse confounded," and the naturalist is almost inclined to give up in despair the task of unravelling the tangled and confused relations of the species composing the group. To meet successfully these unfortunate obstacles to a clear exposition of the history of this branch of the animal kingdom, especially as it exists on our Pacific coast, will yet require years of patient labor and investigation.

In preparing this report we have been guided to a great extent by the able work of Sir John Richardson, contained in the pages of his *Fauna Boreale Americana*, and by the notes of Dr. Gairdner published therein. For great assistance we are also indebted to the writings of Dr. Charles Girard and J. Carson Brevoort, esq., as well as for the friendly services of both gentlemen. Valuable manuscript notes have been furnished by Dr. James G. Cooper, George Gibbs, esq., and Dr. C. B. Kennerly. The three gentlemen last named have spent much time in the northwest, engaged for the most part in scientific researches. During my own residence in Oregon and Washington Territories I endeavored to obtain reliable information regarding this group of fishes; but as I was engaged in many other pursuits, the data collected were not nearly so complete as desired.* Since I returned to the Atlantic, Mr. Gibbs has very kindly furnished me additional notes of his own, besides valuable memoranda communicated to him by Mr. John Swan, of the Puyallup salmon fishery, (Puget Sound,) and by Angus McDonald, esq., the officer in charge of the honorable Hudson Bay Company's trading post, Fort Colville.

It would be highly desirable to trace out the connexions existing between the *Salmonidae* of our Pacific coast and those of Russian Asia and Japan. Descriptions of many of these are contained in Pallas' *Zoographia Rosso-Asiatica*, some of which have been alluded to while treating on particular species in the earlier portion of this report.

The *anadromous* salmon and trouts (those running up from the sea) are not found in Oregon or Washington Territories above the great falls of the Clark's river, or on Snake river, (Lewis's Fork of the Columbia,) above similar falls. The obstruction on Clark's river is about 200 miles above its mouth; those of the Snake, some 275 miles above the Columbia. Concerning their ascent of the Snake, Mr. George Gibbs communicates the following: "In some of the branches of the Columbia salmon penetrate to the Rocky mountains, but they cannot ascend the Snake above Rock creek, between Fort Boisé and Fort Hall, where the great Shoshonee falls stop them. Above this point there are fine trout. Fort Boisé is a great fishing ground for the Bannacks and other bands of the Shoshonee or Snake tribe, who would be famished if kept away from that place during the fishing season. We found them taking salmon in vast numbers at the end of August, 1849."

In 1854 I visited Fort Boisé *myself*, finding salmon exceedingly abundant in September and October. They were then spawning, and seemed almost to fill the water in places suitable for that purpose. The species, I presume, were principally the *S. quinnat* and *S. gairdneri*, but as to this I am uncertain, as at that time I had not commenced to pay especial attention to the subject.

On the Columbia the best salmon are generally those which enter the river during the spring and early summer months. These are the "common silver salmon," (*S. quinnat*,) square-tailed salmon, (? *S. gairdneri*,) and *white salmon*, (perhaps the *S. tsuppitch*,) besides several other species, such as the *S. paucidens*, &c., &c., which are simply considered by the unscientific as *small individuals* of the kinds named. The autumn and winter kinds are much inferior in flavor

* Several valuable consignments of specimens of these fish, sent by me from Puget Sound and the Columbia river, were lost en route to Washington city.

or richness, and consequently in market value. They include the "hook-nosed" species, besides the emaciated "spring salmon," and others of more or less excellence, yet scarcely any are found at that season equalling the fine kinds of spring. In this connexion, Mr. Gibbs makes the following remarks: "The spring salmon of the Columbia reach a great size, forty pounds being not an unusual weight for them to attain, and I have heard of some reaching seventy. They are excessively fat when they first enter the river, and make much better eating than when caught further up. 'Chinook' salmon bring the highest price.

"In the autumn the white fleshed or *masachee* salmon, as they are often called, arrive. It is observed that the spring kinds do *not* run up the small streams near the coast, but *keep up the great rivers*. At the season of the annual freshet (in June) they overcome the falls of the Columbia, and as it backs up the Willamette, they mount the falls at Oregon City also. The autumnal salmon, on the contrary, run into *all the small creeks*, and even into *ponds* formed by the rains on the prairies. The *spring salmon* enter but few of the rivers on the coast, and only those either of considerable size, or coming from *snow mountains*. Both the spring and winter kinds run up the Klamath and Sacramento rivers in vast numbers."

He adds: "There is a salmon that runs up the Quinaiutl (a river heading in a lake in the Olympic range, and emptying into the ocean just above Point Grenville, between Gray's Harbor and Cape Flattery) which is said to be a different species, *small*, but *VERY fine*. The Indians brought us two about the 20th of February—much earlier than the other salmon enter the Columbia—but they were dressed and partly dried, so that I had no good opportunity of examining them."*

In 1853 and 1854 large quantities of salmon were salted for market at the fisheries near the mouth of the Columbia, and at the Cascades, about 150 miles above. Although the fish, being those taken in spring and summer, were of the finest quality, second to none in the world, [I say this understandingly, having eaten excellent salmon in Great Britain and on the continent of Europe, as well as those brought to the New York markets from Nova Scotia,] owing to carelessness in packing, and to the expense and difficulty that then attended the procurement of proper barrels and good salt, nearly all who went into the business lost money; and the salmon thus miserably preserved reached the markets of San Francisco and New York in such bad condition that they obtained a bad reputation among dealers. I am convinced that should the business be undertaken properly by men *skilled in the business*, who, with ordinary care and a selection of none but the silvery spring salmon (*S. quinnat*, *S. gairdneri*, and *S. paucidens*) on the Columbia, and the schedadhoo, skwowl, and satsup, or those known to the Indians as *tyee* salmon, on Puget Sound, it will be found highly profitable, and that salmon thus preserved would in a very short time be in great demand in all the principal markets of the world.

To attain this result great care in packing would be necessary, and a rigid determination to salt none of the autumnal or inferior kinds, a temptation to which many have succumbed, owing to the cheapness and abundance of such indifferent material. The skowitz (or *S. scouleri*) may be an exception to the rule regarding autumnal salmon; yet even when in its best condition it is a second-rate fish compared to the others. Of this salmon Mr. Gibbs says: "Messrs. Riley & Swan, the proprietors of the Puyallup fishery, on Puget Sound, consider the skowitz (skokwid) a good fish for curing, because they are of so fit a size, *being not too large*. They put up 800 barrels in six weeks, and were the first persons on the sound to use the *seine* in capturing

* It is possible that this kind may be the species described by Girard as the *Salmo* (Fario) *aurora*.—(See Gen. Rep., p. 308.)

salmon. The Indians take them in weirs and by spearing. In curing, the salmon *shrinks one-half in bulk*. This shrinking should take place in the 'striking tubs' before packing, that they may keep solid."*

The salmon of Puget Sound and its affluents are probably not all precisely identical with those of the Columbia, although for the most part the species are the same. Puget Sound is an arm of the sea running into the land through a gap, called the Straits of Fuca, lying between the south end of Vancouver's Island, and the shores of Washington Territory. It extends to a point some two hundred miles in the interior, and notwithstanding the number of fresh mountain streams which empty into it, is apparently as salt at its head as the waters of the ocean itself. There are many islands in the sound, and, as a consequence, there are numerous narrow crooked passages, so that the whole, when stretched on a map, looks like a cunningly-contrived aqueous labyrinth. The streams which empty into the sound for the most part arise in the snow ranges on either side. The principal of these are the Nisqually, Puyallup, Dwamish, and Snohomish rivers, and adjoining Puget Sound—forming part of the same water system in Bellingham bay and the Gulf of Georgia—we have the Lummi river emptying. All these streams are rapid and cold, and, considering the amount of water which flows through them, short of extent, the dividing ridges of the mountains being generally not more than sixty or seventy miles in a direct line from the sound.

Puget Sound *proper* has scarcely any rock bottom, and but two or three reefs. Near Bellingham bay, and along the north side of the straits, many rock islands occur. Along the shores are many sandspits partially surrounding shallow bays, in which vast number, of young salmonidae feed and live, and where for a short time before the season of entering the rivers the adult individuals of each kind may be found. It is in these situations that most of the good salmon taken by the Indians during the cold months are caught. Although salmon have been as yet unknown to take bait or the *fly* after entering the rivers of that region, they nevertheless are caught in the *salt bays* in large numbers by the natives. The following plan is pursued: A small herring, four or five inches long, is tied to a hook. Some six or eight feet from the bait a small round stone is fastened to the line. The stone acts as a "sinker," keeping the bait sunk some six or eight feet below the surface while being "trolled." The Indian in a light canoe paddles about slowly and noiselessly, trolling the line with a jerking motion, and not unfrequently taking in the course of a couple of hours several handsome fish, weighing from ten to thirty pounds each. The time chosen for this business is generally the two hours succeeding day break and an hour or two towards evening.

Besides the species contained in the list given, there are probably several salmon and trout, occurring in the Oregon fauna, which have as yet been undescribed. Some of those known may have been formerly described by Russian naturalists, as already stated. To one unaccustomed to the variations in appearance caused by age, sex, and condition, in individuals even of the same species, the proper classification of the northwest salmonidae may not seem a difficult subject. But practically—and we hope that we may be pardoned for again reiterating previous remarks—the reverse is the case. Added to alterations in color, according to different stages of exhaustion, which are as great as those which have rendered the dying dolphin noted, we have alterations in contour and a difference in the anatomical appearance of the jaws and

* After going through the "striking tubs" I am told that the salmon should be forced into the barrels by a press or screw, so that the fish which are piled up to a point one-third higher than the depth of the barrel shall be forced in by the barrel "head," which is pushed down by the screw. Thus closely packed, there is no danger of their "working" and becoming disorganized by the motion of a vessel at sea.

teeth,* which occur so rapidly in the same individual that the novice might readily be pardoned for supposing—Rafinesque-like—an indefinite series of new genera and species.

The idea that most of the species now recognized are simply varieties of one or two kinds is equally preposterous, as shown by making careful anatomical comparisons between individuals of different species, thus showing *constant distinctions* when compared at corresponding seasons. In some species the “hooked-snout” is peculiar to the *males* when fresh-run and in good order. In others this feature is only recognized as a mark of exhaustion or of age, and occurs in both sexes. Alterations in color have been frequently spoken of in this report. Some idea may be gained of these by examining Agassiz’s plates of similar changes in the European *S. salar*. Besides the differences in the changes noticed between one species and another, are those between the two sexes of the same species. This, in the case of the salmon seen by me spawning in Burnt river, was very well marked.—(See beyond.) In describing the colors of a species under the head of *specific characters*, none but those of the “fresh-run” adult should be entered. Additional confusion in our books has been produced by the carelessness of explorers in this respect. An example of this appears to be in the colors assigned to *salmo Clarkii* by Dr. Gairdner; but, as they have evidently been described from an exhausted fish, or one at least partially so, I confess my inability to identify the species with certainty.—(See remarks under the head of *Salmo clarkii*.)

Several of the autumnal salmon are of a dingy color, even when in good order and fresh from the sea. Their flesh is light colored and of poor flavor, and some are so rank as to be positively disagreeable. If ever silvery, it must be when in the sea, long before instinct has sent them to the rivers to attend to their reproductive duties. If that is the case, it would seem that the change in color is as much owing to a disturbed condition of the system, produced by sexual commotion, as to emaciation and fatigue.

All species—the *trout* less so than the others—go through these changes of color after remaining a short time in fresh water; the changes being most noticeable as the fish is becoming rapidly exhausted. The bright silvery species lose their glistening appearance, the blue and lead colors of the back become green or dingy olive, and the silvery white of the sides and belly blotched with patches of dark olive, alternating with purplish maculations.

These purplish discolorations, or rather colorations, frequently change into deep red, and sometimes into lake, the fins especially showing the red. It might seem that this intermixture of red would indicate an activity of the circulation. This is not the case, but seems to be the result of a stagnation of the blood in the superficial capillaries, and another evidence of the broken down scorbutic condition of the impoverished fish.†

The salmon are said not to eat after their entrance into fresh water; notwithstanding this, they have to undergo the exhaustion consequent upon their exertions in ascending the rivers, jumping water-falls, and stemming currents, which, superadded to the debility necessarily produced by the process of spawning, sufficiently accounts for their impoverished condition during and after spawning season. Indeed, hosts upon hosts do not survive, but die after completing their instinctive duty, and often before. Some of the shores of the small lakes and tributaries of the Columbia are said to be lined with the dead and dying fish in autumn. Salmon that enter the Columbia ascend the principal river as high as the lakes on its course

* The wasting of the flesh and consequent absorption of the fat of the fish, causes the gums to shrink from the teeth and the nose to assumed a hooked form. The teeth thus exposed look much larger than before.

† See remarks under the head of *S. paucidens*.

through the British Possessions; but short of those points vast numbers turn off into its numerous tributaries, the Yakima, Snake, Okanagan, and other rivers. During the course of an expedition against the Snake Indians, in 1854, the writer saw vast numbers of salmon in the small tributaries of the Snake, Boisé, Powder, Burnt, Peyette's, and other rivers, at points nearly 250 miles from the mouth of Snake river, and about 650 from the Pacific ocean. This was in September and October, when the fish were all engaged in spawning. Passing by the multitudes and multitudes of these fish, sufficiently in this respect worthy of wonder, we shall proceed to describe the act of spawning as witnessed at Burnt river on the southern slope of the Blue mountains of Oregon. Camping at a point where the stream was tortuous, and its waters clear and rapid, we saw a female salmon, some two and a half feet in length, dart rapidly down stream, to a spot abreast of where we were standing on the bank at the head of a rapid. She turned suddenly about, resting with her head towards the current, which was rather strong. Upon looking closely we observed that she was over her spawning bed, a peculiar looking cup-shaped depression, of about three feet in diameter, in the bed of the stream. This had evidently been produced by the lashing of the tail and fins. The fish remained stationery over the "bed" about half a minute, keeping herself from being forced down with the current by gentle motion of the fins, and during her stay apparently discharging a few ova, some of which were probably washed down the rapid, the rest falling into their proper receptacle. She then suddenly darted up stream to a quiet resting place. Immediately upon her departure *several* males took her place over the "bed," and remained there about the same length of time; they in turn retreated to a place of repose, the spawning "bed" being quickly again occupied by one or more females, followed by males as before; the same bed thus serving for about half a dozen individuals of both sexes. The *period of repose* seemed to be about two or three minutes for each individual.

It was pleasing to witness the regularity with which males and females succeeded each other, and also the spirit of combination which they manifested by depositing spawn and milt so frequently in couples, each sex by itself, and each sex retiring to a *resting place* while its opposite was engaged in his or her particular duty. The water on the spawning ground was about three feet deep. The females were invariably the largest, their lengths being between two and three feet. They also, as seen through the water, showed much of the red and purple congestion of the skin and fins, already spoken of as a condition of exhaustion. The males scarcely exceeded 20 inches in length, and were of a pale olive-gray color, very uniform with each other, and scarcely, if at all, showing any red. Thus we see that this particular species of salmon, at least, carries on the reproductive process by companies, and that both males and females in alternating with each other in their duties seem to be impelled by fixed laws and habits of custom or instinct. It was also interesting to see how they retreated after each emission of spawn or ova to *quiet* places of the stream, where, totally at rest, they could rapidly recuperate their energies for the next endeavor. We supposed that the species were the same as those that arrive at the great falls of the Columbia at the Dalles in such vast quantities in April, May, and June.

Angus McDonald, esq., for many years the officer in charge of the Hudson Bay trading post, Fort Colville, (situated at the Kettle Falls, on the Columbia river, but a short distance below the mouth of Clark's Fork,) furnished the following notes on the Salmonidæ of the upper Columbia. The remarks were dated Fort Colville, September 1, 1854, and were kindly communicated by George Gibbs, esq.:

The salmon, as seen at that place, are as follows :

"1. *Seemetleek* arrives at Colville about the 1st of June. On its arrival the jaws and nose are *straight*, with teeth scarcely perceptible. When the male and female couple, to discharge the duties of their watery hymen, they, like other couples, begin to grow thin. As their flesh declines the teeth begin to show and the snout to get crooked, whence we call them the *crooked-nosed* salmon. The *Seemetleek* is the largest of the species, the first to arrive and to die.

"2. *Keasoo*, or *Kakasoo*, arrives here about the 1st of October. *Whether fat or lean, it always has a crooked nose.* It is not so large as the *Seemetleek*. We have proof that the *Keasoo* do not all return, because they have been seen and caught in the winter and spring in many of the Columbia's tributaries, *i. e.*, Yakima, Okanagan, and Spokane Forks. They are, on an average, about three feet long, and each male with *one female*, like the *Seemetleek*. The female first spawns in a favorable place. Immediately by her side is her mate, who discharges his masculine fluid upon the eggs, whereupon the industrious couple cover their seed with sand.

"3. *Stzoin* arrives here about the 1st of July. Straight nose *always*, length about two feet, and breeds like the rest. They are not found dead, and are supposed to return to the sea.

"4. *Cha-cha-ool* (the *ch* pronounced guttural, as in the Gaelic *loch*) arrives with the *Seemetleek*. It is rather heavier than the *Stzoin*, marries, breeds, and dies, like the *Seemetleek*. Whether *all* or only some of these two kinds die is very uncertain. When these fish die from fatigue they are called by the natives *Skee-le-ways*, a word in their language implying the lean, bad condition of the flesh."

NOTE.—The Indians living at Fort Colville speak a dialect of the *Flathead* language, which itself is not a very remote dialect of the *Nisqually*.*

The *Seemetleek* is probably the *S. quinnat*, RICH. The *Cha-cha-ool*, which arrives at Fort Colville in company with the last, corresponds greatly with the description of the *S. gairdneri*, RICH, and but little doubt exists in my mind that they are identical. The *Stzoin* I cannot identify. Perhaps it is the *S. paucidens*, RICH. The *Keasoo* seems to be the *S. scouleri*, RICH.

Fort Colville is situated at the Kettle Falls, about seven hundred miles by water from the ocean. As the *S. scouleri* enter the river near the 1st of September, their progress against the current would seem to be about one hundred miles a week.—S.

Specimens of the following salmon are very much wanted to complete the series in the Smithsonian collection, as well as to settle many doubtful points. For the convenience of those studying in the field, or collecting, the Indian names of those desired are here given:

At the mouth of the Columbia *true* Chinook is generally spoken. The fish from that locality *wanted* are the *Queachts*, *Quannich*, *Ekewan*, and *Tsuppitch*. These names probably hold good at the Dalles, where "Upper Chinook" or Wasco is spoken. Among the Dalles Indians, however, and also among those living at the Cascades and at Fort Vancouver, there are many who speak dialects of the Walla-Walla language, which is entirely different from either the Lower or Upper Chinook. These dialects are usually either *Klikatat*, *Des Chute*, or *Yakima*. Any fish obtained having the following *Yakima* names are also much wanted:

Kah-lo, (perhaps the *Op-kal-loo* of the Wascos at the Dalles.)

Ne-ukw.

S'han-nih, (? *Sah-wun-ugh* of the Cowlitz tribe.)

Kwin-nat-tit, (? *Quinnat*.)

S'hun-no, (? *Huddo*, or *Hunno*, of the Nisquallies.)

* See list of species, with accompanying Indian names.

From the Cowlitz river the *Sah-wun-ugh*, or *Sab-o-uch*, also the *Hwal-lat'n*.

From Puget Sound and vicinity *Keh-o-oh*, or *Skeh-oo*, from Hood's canal. This fish is caught in January. Its bones are said to be very hard. (See foot note 13, attached to list of Indian names for salmon.)

From near Whidby's island the *Skai*, or *Sky*, (Skadgett.) This is a very fat kind, with a hooked nose, caught in September.

To-o-odlt, or *To-walt*, the large kind, found in July at "Tobin's mill," Dwamish river.

To-mutsh, from Simiahmoo, near Bellingham bay.

For the benefit of collectors, or those inclined to study this group from fresh specimens, I have added a list containing the scientific synonyms of all the species yet recognized as being found in the waters of Oregon and Washington Territories, as well as the names by which they are commonly known to the settlers, and also the Indian names in as many dialects as I have been able to collect. The Indian names will be of great service to collectors and students, although they must be relied upon with caution. George Gibbs, esq., says: "Indian observation is good, but in certain cases, especially where differences between species are but slight, they are liable to mistakes, as their information extends only to one season for individuals. I have sometimes thought that they apply *different names to males and females of the same species of salmon*, as we know they do to the male and female *elk*. I have ascertained, beyond a doubt, that different names are applied to the same salmon when '*fresh run*,' and *when exhausted*. This is not only the case with the tribes on Puget Sound, but, as we see by Mr. McDonald's notes, the same custom prevails with those living high up on the Columbia."

List of salmon and trout found in the waters of Washington Territory and Oregon, with their scientific synonyms and common names as known to the whites, together with their names in the different Indian languages and annual periods of arrival from the sea.

Scientific synonym.	Vernacular.	Chinook jargon.	Columbia river.				Puget Sound and vicinity.			Periods of arrival from the sea.
			Lower Chinook.	Upper Chinook, (Wasco.)	Spokane and Colville.	Yakima and Walla-Walla.	Nisqually.	Challam.	Lummi.	
1. <i>Salmo quinnat</i> , Rich.	Spring silver salmon.	Tyee salmon.	a Quinnat.	..	b See-met-leek.	? Kwin-nat-tit.	d ? Satsup.	{ ? Kwit-shin. } Klutch-in.	..	April and May.
2. <i>Salmo paucidens</i> , Rich.	Weak-toothed salmon.	..	c ? Quannich.	..	b ? Stzoin.	..	..	..	..	May and June.
3. <i>Salmo argyrea</i> , Grd.	..	..	..	..	..	? Watch-pitch-ee.	h ? Satsup.	..	..	Autumn.
4. <i>Salmo tsuppitch</i> , Rich.	? White salmon.	..	a Tsuppitch.	..	..	? Ik-kown.	..	..	..	? September.
5. <i>Salmo truncatus</i> , Suckley.	{ Silvery winer salmon. } { Square-tailed salmon. }	..	..	..	..	..	m ? Skwowl.	Klutch-in.	..	? Mid-winter.
6. <i>Salmo gairdneri</i> , Rich.	Spring salmon.	Tyee salmon.	c Quannich.	..	b Cha-cha-ool.	Shoo-shines.	..	..	..	May and June.
7. <i>Salmo gibbsii</i> , Suckley.	Black-spotted salmon trout.	..	..	..	..	..	..	..	..	Not anadromous.
8. <i>Salmo confluentus</i> , Suckley.	..	..	..	..	..	..	g To-o-oddit } To-wat.	..	..	June.
9. <i>Salmo scouleri</i> , Rich.	Hooked-nosed salmon.	..	a ? Ekewan.	..	b Keasoo.	..	e Sko-quid } Sko-witz.	e Kutch-kus. } Met-hilts.	..	September and October.
10. <i>Salmo gibber</i> , Suckley.	Hump-backed salmon.	..	..	..	..	..	Huddo.	..	f Hannun.	September and October in alternate years.
11. <i>Salmo canis</i> , Suckley.	Dog salmon, spotted salmon.	Le kai.	..	..	..	..	Tl-hwhai.	..	..	November.
12. <i>Salmo spectabilis</i> , Girard.	Red-spotted salmon trout.	..	..	..	..	..	n ? Pus-sutch.	? Com-mah-mah.	..	Mid-summer and autumn.
13. <i>Salmo (Fario) aurora</i> , Grd.	..	..	..	..	..	..	..	..	..	See remarks on the species.
14. <i>Salmo clarkii</i> , Rich.	Brook trout.	Tenas salmon.	..	i Op-kal-loo.	..	..	Kwus-pud.	..	..	Not anadromous.
15. <i>Salmo (Fario) stellatus</i> , Grd.	Brook trout.	Tenas salmon.	..	i Op-kal-loo.	..	..	Kwus-pud.	..	..	Not anadromous.
16. ? <i>Salmo (Salar) levisii</i> , Grd.	Missouri trout.	..	..	..	..	..	..	..	..	
17. <i>Thaleichthys pacificus</i> , Grd.	Eulachon.	U-lan.	..	..	..	..	Kwul-lus-teo.	..	..	

a Given on Gairdner's authority.—(See Rich., F. B. A.)

b Angus McDonald, esq., in lit.

c "Queachts," by mistake; Dr. Gairdner. (See Rich., F. B. A.) Dr. Gairdner's labels were misplaced.

d This fish is the *Yoo-mitch* of the Skadgets. When worn out it is called by them, and the Nisquallys also, *Yock* or *Yoku*. This name is also applied by the Nisquallys and Puyallups to exhausted individuals of a species which, when "fresh-run," is known to them as the *To-wat*, or *To-o-oddit*, a very large kind, which I have thus far been unable to identify. It is taken in Black river, a branch of the Dwamish, about twenty-five miles, as near as I recollect, from Puget Sound. The Skadgets apply a different name to that fish when exhausted, calling it *Skole-kum*. According to Mr. Gibbs, the Skadgets call all fresh-run salmon *Sche-dad-hu*, which is generic, and does not prevent specific names, which again are changed according to the condition of the fish.

e The Skadgets say that they have a second variety or species of *hook-nosed* salmon, which they call *Skai*, or *Sky*.—(See notes under head of *S. scouleri*.) According to Mr. Gibbs, this hook-nosed salmon is called by the Challam Indians *Kutch-aks*, and is identical with the Skowitz of the Nisquallys. He adds

that another very similar fish is called by the Challams *Met-hilts*. It is the white or pale fleshed salmon caught in September and October, and is, perhaps, the *Kutch-aks* (called also *Kutch-kus*) partially exhausted.

f Dr. C. B. Kennerly.

g ? Not the *To-wat* of the Skadgets, referred to in note d.

h A specimen of this fish, described by Dr. Girard as the *S. argyrea*, was sold to me by a Nisqually Indian, who called it *Satsup*. I am inclined to think that it is not their true *Satsup*, caught in spring.

i Both of these trouts are confounded by the Indians and settlers. A trout is found in the Cowlitz river which is called by the Indians "*Hual-lat'n*." It is probably the *S. clarkii* of RICHARDSON.

j No note.

k Is probably found in the headwaters of Clark's Fork.

l Mr. George Gibbs.

m Mr. Gibbs says that *Skowul*, like *Sche-dad-hu*, (see note d.) is generic, and, among the Skadgets, applies to but two kinds, the *Yoo-mitch* and the *Kch-oo'h*.

n Also called *Cheewagh*, apparently identical with the *To-mulsh* of the Simiahmoo Indians.—(Gibbs.)

Dr. Cooper furnishes the following memoranda :

"In consequence of not having sufficient alcohol for the purpose, I never preserved specimens of the various species of salmon which frequent the Columbia and the rivers of Shoalwater bay, excepting the heads of several species collected during the journey east of the Cascade range, and which were destroyed from weakness of the alcohol. Yet a few remarks upon their habits, made during my residence there, may not be uninteresting.

"Salmon enter the Columbia river in large numbers about the 1st of May, and are caught then at Chinook Point, a few miles above Cape Disappointment. From this fact they are generally known as the "Chinook salmon," and are celebrated not only in the Territory but in California as the best salmon caught on the coast. The reason for its superiority when caught at Chinook Point is probably that, this being the first point where they can be taken after entering the river, they are still in fine condition, while after ascending the river they become thin and lose their finest flavor. It seems to be generally believed that they do not feed in fresh water, the stomachs of those caught further up being always empty. It may easily be imagined that this must soon exhaust them, and it seems almost incredible that they should ever be able to go up four hundred miles, over innumerable rapids and falls and against a current which must require their constant exertions to contend with. But by reference to my journal it may be seen that we found them in great numbers in the Okanagan river, at the 49th degree, where they had every appearance of having travelled all the way from the ocean. Their fins and tails were so worn down as to be almost useless, their color had changed to a dappled mixture of red and white, and they were emaciated so as to be a mere mass of skin and bones. But still they struggled on up, obedient to the blind instinct which led them to seek the very headwaters of the river to find a fit nursery for a progeny which they should never know.

"It of course excited much speculation in our minds as to the law of nature which should doom so many thousands of fish to certain death, and apparently, contrary to all analogy in the class of fishes, to die after making but one deposit of eggs. No solution of the matter was then suggested, but in thinking it over since, I have arrived at a theory on the subject which I will now state:

"It will be observed that such large numbers of dead or dying salmon are found mostly at the headwaters of streams, and that they increase in number the further we ascend from the sea. It is also the fact that great numbers go up the small streams emptying into the sea from the Coast range, and do not there die in any quantity unless they have to ascend many falls and rapids. I never saw anything like the number of salmon in that condition at Shoalwater bay, although I have seen tons of them there.

"Another noticeable fact is that all those seen in the Okanagan river were small, not more than two feet long, and very uniform in size. Besides this, they seemed to be of the same species as we saw further down the Columbia. They certainly were not of any species of trout constantly inhabiting the river, of which I had already seen three. Now, the reason I would assign for the 'wearing out' of some salmon annually is this: Shoals, probably composed of fish of different ages, enter the river, the larger and smaller keeping in distinct bodies. Their ova are more or less mature, perhaps according to the age of the fish, and they continue to ascend the river until the ova become ready for deposition. This I know often occurs quite near the sea, as salmon may be seen making their *nests* in the clear water of the Willopah, not more than fifteen miles from its mouth. But that it is not always so is shown by

the very fact that others continue to ascend for a long time after. Those in which the deposition takes place soon after they enter, doubtless return lightened and vigorous to the sea, while those in which the maturation is more retarded must keep on ascending as long as the water is deep enough for them to swim in, when they probably remain stationary for awhile, unless they fall a prey to the numerous enemies always watching for them in such places. Those which go up the Columbia can alone be supposed to go far enough to become worn out, and such can never return to the ocean, but are found dead and lining the shores of the river in immense numbers.

"I cannot determine whether the salmon which are caught at Chinook Point in May are of the same species which are found further up in the fall, but think that they are all bent on the same errand, although far the greatest number enter the river in autumn. They are then much less fine than in spring even at the mouth of the river. I have little doubt that quite as good salmon may be taken in small numbers in the mouths of other rivers in spring, but they are not fished for on account of their scarcity.

"As may be supposed from the fact of their not eating in the rivers, salmon cannot be taken with a baited hook after entering fresh water. The mode usually adopted in shallow water is to pull them out by means of a strong iron hook, six inches around its bend, fastened on to a long pole. This is easily put under them, as they appear regardless of everything but their own immediate object. Another mode, chiefly followed by the Indians when they first enter the bays, is to spear them. They often swim, in calm weather, close to the surface, so that the sharp eye of the savage can detect a slight ripple produced by their back fins. The salmon being there quite timid, it requires much caution to enable the Indian to get a fair blow at them, but when he does it rarely misses its aim. With the swiftness of a musket ball he launches his spear, and its long barbed head piercing entirely through the fish, the shaft at once separates from it and floats off on the water. But a strong line holds the barb, with which the fish is soon pulled into the canoe and despatched by a blow on the head with a wooden mallet, made for the purpose. This is necessary, because the canoe used in this kind of fishing is often barely large enough to hold a man, and the struggles of a salmon four feet long would upset it, besides the probability of its jumping out. The *seine* is used to some extent in the Columbia and in Puget Sound. I once caught a fine salmon, fresh from the ocean, with my hands. It had entered a little brook with the rising tide, and when it fell attempted to get out, but was stopped on the gravelly flats which border Shoalwater bay, and where the brook spreads out into many shallow branches. I was first attracted by its violent flapping as it attempted to get down into salt water, and easily captured it. It was like others caught in the bay, quite as good as the famed *Chinook* salmon."—C.

In the preceding remarks by Dr. Cooper we find many interesting facts mentioned, some of which are new, and others corroborating the statements of previous observers. The wearing out of the fins, tails, &c., spoken of as occurring in those fish which ascend violent and rocky streams is not uncommon. In Richardson's *F. B. A.* III, pp. 216, 217, there is an extract from Harmon's *Travels in North America*, 1820, containing the following remarks on this subject: After stating that about the middle of August the salmon appear in the larger rivers of New Caledonia, (British Columbia,) lasting plentifully until about the beginning of October, Harmon says: "For about a month they come up in crowds, and the noses of some of them are either worn or rotted off, and the eyes of others have perished in their heads; yet, in this maimed condition, they are surprisingly alert in coming up rapids. These maimed fishes are

generally at the head of large bands, on account of which the natives call them *mee-oo-tees*, or chiefs. The Indians say that they have suffered these disasters by falling back among the stones when coming up difficult places in the rapids which they pass."

The method of capturing salmon by "hooking" them, in the manner described by Dr. Cooper, is in vogue with the Indians of Puget Sound, who, in this way, take vast quantities of the *autumnal* species, which, as already stated, are fond of entering the more shallow streams.

At the great *Dalles* fisheries on the Columbia I did not notice the disposition of the salmon to arrive in series according to age, but in June, 1855, I remarked, on the contrary, that vast numbers of fish of *all sizes*, varying from a pound and a half to 30 or 40 pounds, were taken promiscuously together.

The question whether all individuals of certain species of salmon do not die in fresh water soon after spawning, none returning to the sea, is a mooted point on our northwestern frontier. Pallas, in speaking of certain of the salmon of Kamtschatka, takes particular pains to state that they do not return to salt water. Thus, in referring to the *S. proteus*, or hunchback, he says: "After the month of August has been passed in the functions of generation all of these fishes perish in the rivers, and strew the land and the banks of the rivers with their dead bodies, *none* returning alive to the sea."—(See Pallas Zoographica Rosso-Asiatica, *Fishes*, p. 377; also translation beyond under the head of *S. gibber*.)

On this subject Dr. Scouler remarks as follows:*

"Pennant says the Kamtschatka salmon die without returning to the sea after spawning. I never heard such an opinion mooted on the northwest coast, and saw nothing to confirm it; but, as the streams which the American salmon ascend are often extremely shallow, and as they spawn in Observatory Inlet during the months of July and August, when the water is at the lowest, I should suppose that great numbers must perish from emaciation, (for their flesh then becomes white, or at least a great deal less red, and of bad quality,) and from the extreme difficulty they must experience in returning to the sea from the want of water, and perhaps from its high temperature. Thousands also must be devoured by the osprey, the white headed eagle, and the otter, in the fresh waters, and by the seals in the sea, so that I should think few survive. I am unable, however, to say whether any return to the sea or not."

Since Dr. Scouler wrote, many white settlers have located themselves on the north Pacific coast of America, and large and flourishing settlements have grown up. In consequence, observation in all branches of natural history has been much extended, and our knowledge of that hitherto obscure region increased. It seems from the accounts of recent observers that *certain species* of salmon do not, in general, return to the sea after spawning, but die in the fresh water streams remote from the ocean. Other species, on the contrary, seem to return to the sea, no matter to what distance in the interior they may have penetrated. Of course, in speaking of a species we mean the bulk of individuals belonging to it, forming the "run" or migration. Of all kinds vast numbers die from exhaustion and the attacks of their various enemies, but certain species appear, as a rule, to die out after completing their procreative efforts, while the great number of individuals composing other species *return to the sea*. Some think that *distance from salt water* is the governing condition affecting the return. This it does to a certain degree, but still the individual instincts and tenacity of life of certain *species* have probably more to do in regulating it. Angus McDonald, who writes from the Kettle falls, a point far up the Columbia, says that the *see-met-leek* (*S. quinnat*) are the first in the season "to

* Scouler in *lit.* Rich. F. B. A., III, 159.

arrive and to die." Again, he says of the *stzoin*, "they are not found dead, and are supposed to return to the sea."

The Nisqually Indians say that the majority of the *Tl'hwai* salmon return to salt water after spawning; that many of the skowitz return, but that *more* die in fresh water. They think that but few of the other species, in proportion to their numbers, ever get back into salt water. The *huddole*, especially, generally die in fresh water, and they doubt if these return at all, or, if they do, only a few lucky individuals escape.

I am assured, by a reliable observer, that he has found, in the autumn, the banks and sand bars of the Cowlitz river—a stream emptying into the Columbia at a comparatively short distance from the ocean—lined with dead and dying salmon. This argues in favor of death occurring more according to difference in species than from fatigue or distance from the sea. Fatigue and distance, however, have full weight in increasing the mortality. In conclusion we therefore venture to suggest that probably certain individuals of *all anadromous species* do return to the sea after spawning; but that the comparative numbers of individuals thus returning is varied, *cæteris paribus*, by distance from the sea, or the character of the streams traversed; and that the desire or instinct to return to the ocean after performing the sexual duties is much more strongly manifest in certain species than in others.

The incurvation of the extremities of the intermaxillaries and chin, in certain species, varies greatly with the age and sex. According to some observers the *females* of particular kinds are always destitute of the "hooked snout," while the adult *male*, even when in good condition, always has a lengthened decurved intermaxillary protuberance.* Other species, when in good condition, have both jaws symmetrical; but, when emaciated, an *apparent* prolongation, in a downward direction, of the intermaxillary protuberance is seen, and a corresponding exaggeration of the "knob" at the chin. Much of this is induced by the absorption of the fat and shrinking of the tissues along the sides of the jaws, the deficiency in contour thus produced by contrast causing the unabsorbed cartilaginous extremities to appear as if unnaturally developed. Examples of this are seen in the changes found in the mouth of the *S. quinnat* at different seasons, and also in that of the European *S. salar*. Indeed, I think it probable that much of the confusion in the synonymy of some of the European species has been caused by mistaking certain fish, which, in other respects, agree closely, but have the *apparently* elongated extremities to the snout and chin, for other species possessing normally their characteristics when not emaciated, and which, in other respects, agree very closely. Perhaps in this way the *S. salar* and *S. hamatus* have been confounded. Beyond a question the adult male *S. scouleri* has the decurved cartilaginous protuberance *always* well marked, which the female equally often *lacks*. The *fresh run* species, known as the *S. quinnat*, when in good order has a mouth with regular outline in both sexes. I have, at times, noticed, in *very large* and fat individuals, that the snout was enlarged and somewhat decurved. I account for this by supposing that they are fish which, having been much emaciated from spawning at some previous season, had returned to the sea. Becoming recuperated and much increased in size, they have again ascended the rivers for the purpose of procreating, their condition and flesh having been entirely regained, with the exception of the fat deposits about the bones of the mouth. This theory, although, perhaps, fanciful and incorrect, is the best that we can offer while situated so remotely from the field, where alone the history of the fish can be thoroughly ascertained. As a reason why, on the contrary, the foregoing speculation may prove false is

* See remarks concerning this character contained in the account of *S. scouleri*.

the fact that the *very large* specimens seen by me were but cursorily examined, and may, in reality, have belonged to a distinct species.

The discussions which have so frequently occupied the minds of British naturalists concerning the real character and position of the small salmonidae, known to them as "*smoults*," "*grilse*," &c., are of collateral interest to American ichthyologists. The study of this family, in America, is much less trammelled by a multiplicity of names for the immature fish, and, as suggested by Sir John Richardson, may, for that reason, assist much in throwing light upon perplexing obscurities in which the subject is involved in Europe. Many valuable experiments have been carefully instituted by gentlemen in England for settling these vexed questions. Young salmon have been marked and then turned loose, which have been again taken at successive seasons, until gradually a complete chain of evidence has been thus adduced, showing each change, step by step, and link by link, from extreme youth to maturity.

1. SALMO QUINNAT, Rich.

Salmo quinnat, RICH. F. B. A. III, 1836, 219.—DEKAY, N. Y. Fauna, IV, 1842, 242.—STORER, Synopsis, 1846, 196.—HERBERT, Supplement to Frank Forrester's Fish and Fishing, &c., 1850, 31.—GRD. in Proc. A. N. Sc. Phil. VIII, 1856, 217.—IBID. Pacific R. R. Reports, vol. VI.—IBID. Gen. Rep. Fishes, 306.

Common Salmon, LEWIS & CLARK.

FIGURES.—A young fish called by this name, and probably belonging to the species, has been figured under Dr. Girard's supervision, and appears in the General Report on the Fishes collected by the United States Pacific railroad surveying parties, PLATE LXVII.

SP. CH.—*Adult*: Head pointed and large, forming about a fourth of the length from the snout to the end of the scales on the caudal.^o Dorsal outline regularly arched. Caudal deeply cut out, (in the dried specimens forked.) Snout cartilaginous, as in *S. salar*. Chin pointed, a triangular bare projection extending beyond the teeth. Colors:† "General tint of the back bluish gray, changing after a few hours' removal from the water into mountain green; sides ash gray, with silvery lustre; belly white; back above the lateral line studded with irregular rhomboidal or star-like black spots, some of them ocellated. Dorsal fin and gill covers slightly reddish; tips of the anal and pectorals blackish gray; the dorsal and caudal thickly studded with round and rhomboidal spots, back of the head sparingly marked with the same. Whole body below the lateral line, with the under fins, destitute of spots."—(GAIRDNER in lit. RICH. F. B. A. Fishes, 220.) Scales large. Branchial rays varying from 17 to 20.

Young:? "Body fusiform in profile, compressed; head forming about the fifth of the total length; maxillary bone curved, extending beyond the orbit; anterior margin of the dorsal equidistant between the extremity of the snout and the insertion of the caudal. Dorsal region olivaceous, studded with irregular black spots; dorsal and caudal fins similarly spotted. Region beneath the lateral line unicolor, silvery along the middle of the flanks, and yellowish on the belly. Inferior fins unicolor. Head above blackish gray; sides bluish gray."—GIRARD.

In shape, and in many other particulars, this fish agrees with the description given in PALLAS, ZOOG. ROSS. ASIAT. of the *S. orientalis*, and, as quoted by BREVOORT in notes on some figures of Japanese fish, like it, reaches a weight of sixty pounds; ascending the larger rivers only in the months of April, May, and June; in having fleshy lips, and in gastronomic excellence. It also has a large pointed head, with very similar jaws. It differs from Mr. Brevoort's figure in having the tail much more deeply cut out—almost forked—and in having spots on the back and head. It also but seldom attains the large size given above, the average being usually about twenty-five pounds. Valenciennes says that the *S. orientalis* has numerous crescent-shaped spots above the lateral line. This remark is based on a drawing, taken by Mertens, of

^o The size of the head of most salmon seems to vary in the two sexes, that of the male being larger.

† The colors, when given under the head of *Sp. Ch.* in this report, are always those of the fish fresh run from the sea, except when the contrary is stated.

a female.—(See Brevoort's work above quoted, p. 23.) The *S. quinnat*, according to Gairdner, has the spots *differently* shaped. In a memorandum furnished me by George Gibbs, esq., he says that in a visit to Chinook, near the mouth of the Columbia, he saw "the *true* spring salmon of the Columbia. Speckled on back, fins, and tail, with *half-moon* spots. Tail in *large* specimens not always spotted. Tail *forked*."*

The quinnat is designated by Lewis and Clark as the "*common salmon*" of the Columbia. It was first scientifically described by Sir John Richardson from specimens and notes obtained from Dr. Gairdner, who was then (about the year 1835) living at the trading post of the Hon. Hudson Bay Company, situated on the right bank of the Columbia, nearly opposite the mouth of the Willamette river, about one hundred miles from the ocean, then and still known as Fort Vancouver. While stationed as surgeon at that important point, Dr. Gairdner, in a most praiseworthy manner, busied himself actively in studying the natural history of the region, and, in connexion with the labors of Tolmie, Townsend, Nuttall, and Douglass, in the *field*, and of Richardson, Hooker, Audubon, and Bachman, in the *study*, presented to the public almost all that was known to naturalists of that remote portion of the world up to the period when the late scientific explorations were undertaken under the auspices of our government.

This salmon is, perhaps, the finest of all that enter the rivers and inlets of our Pacific possessions. The adults are readily recognized by the settlers from their great size and their large, deeply-forked tails. When fresh from the sea they are in superb condition for the table, equal, in our estimation, to the best English or Scotch salmon. The color of the flesh is of the richest "*salmon red*." The general external appearance of the fish presents very bright silvery reflections. They first arrive in the Columbia river during the month of April—the periodical advents usually varying but a few days. Lewis and Clark speak of their first arrival at the Skilloot village, below the site of Fort Vancouver, on the 18th of April, 1806, and at the Dalles, (two hundred miles above the mouth of the Columbia,) in the year 1807, on the 19th of April. Major G. J. Rains, United States army, noticed them at the latter place, in 1854, on the 28th of April, and I myself saw the first of the season, in 1855, April 11. George Gibbs, esq., in MSS. notes informs me that in 1853 the same species were "*in season*" at the mouth of the Columbia on the 20th of April.

The *quinnat*, in an economical point of view, is by far the most valuable salmon of any species found in Oregon. The extreme richness and delicacy of its flesh cause it to be much preferred for salting; and were it not for the hitherto high prices of labor, barrels and salt, it would have ere this been found a staple article of export from the Columbia.† In numbers, they seem to be inexhaustible, and are readily taken in nets and otherwise. During the "*season*" they are so abundantly taken at the rapids near the Dalles that, notwithstanding the high rates at which most articles of domestic consumption are sold, I have frequently purchased noble specimens of this fish, weighing 20 pounds or more, each, for the small price of a quarter of a dollar! The Indians on the Columbia take immense numbers, eating what they need while fresh, and drying thousands for winter consumption or for trade. The principal method of capture employed at the Dalles is by "*scooping*" at random in the rapid water as it passes a

* I do not consider that the *absence* of spots on the body is of much value as a specific character in *all* cases. But where they *occur* I think that their *arrangement* and *shape* is of great importance. The unspotted individuals are, perhaps, in some instances, simply the representatives of albinos in birds and quadrupeds.

† For further particulars concerning this subject, see "*General Remarks* "

projecting rock along the banks of the stream. The salmon keeping close to the shore, in order to avoid the force of the current, take advantage of "shore eddies" in their ascent. The Indian selects a proper location, generally a projecting rock, upon which he builds a platform, and with a "scoop net," about four feet in diameter, attached to a long pole, rapidly sweeps the water below. The net passing down with the current, and immersed four or five feet below the surface, is alternately dipped and drawn up, again to be plunged in the boiling waters above. During the height of the season it is not uncommon for a single man to thus take twenty or thirty fine fish in an hour. The time chosen is usually during the long twilight of the evening or early morning. Whether this is because the fish do not "run" during the bright hours of the day, or because they, *seeing better*, avoid the net, I am in doubt.

For subsequent consumption the salmon are split open, and the entrails and backbone taken out; they are then hung up in the lodges to dry in the smoke. When perfectly dry they are packed in bundles, and kept in baskets or mats, and in some places, as along the river from Walla-Walla to Fort Colville, large stores are placed on platforms raised on poles some 12 or 15 feet from the ground. This is to protect them from the ravages of wolves. To guard against rain, and the plundering propensities of crows, magpies, and ravens, they are covered by mats or strips of bark, and occasionally with rough-hewn boards; no salt is used by the savages in preparing the fish, yet, nevertheless, the food thus preserved keeps in good order for several years. Dr. Cooper furnishes me with the following notes concerning a salmon, which he has had many opportunities of observing while residing near the Columbia river:

"The name of this salmon is evidently a corruption of that by which the Indians distinguish a small river north of the Chehalis, and which is celebrated among them for the excellence of its salmon. As pronounced by them, it is QUIN-NAI-ŪLT. I have eaten fish from there smoked and also salted, but never saw one fresh. It is smaller than the preceding, those I saw not being more than two feet long. If the same as Richardson's fish, which is probable, it is singular that the Indians should find it so much superior in that river, and that they should contend that it is found there only. I have heard, however, that the same species was caught sometimes in a river running into Shoalwater bay, and it is not probable that the name of the above river is derived from that of the Salmon, and not, as is generally supposed, the contrary. It would appear as if the same frequent the Columbia also."—C.*

Dr. Gairdner says of the *quinnat*:† "This is the species which ascends the Columbia earliest in the season, commencing its run in the month of May, in enormous shoals, clearing the greater Dalles, cascades, and rapids innumerable, and making its way to the sources of the river where, at the close of the season, it is found dead on the beach in great numbers. The muscular power of this fish is truly astonishing even in a class of the animal kingdom remarkable for vigorous movements. * * * * * Individuals of this species have often been seen with their noses fairly worn down to the bone, and in the last stages of emaciation, yet still striving, to the last gasp, to ascend the stream. The selection of particular streams for spawning is a remarkable feature in the history of this fish. It ascends the Willamette, Snake, and Kootenay rivers, &c., and passes by the Kawalitch, Okanagan, Dease's river, and others, seeming to prefer a rapid stream, uninterrupted by falls, to one of a quieter character, though other circumstances must regulate its choice, as some of the rivers which it refuses to enter have an extremely rapid current.

* I think it probable that the fish of the Quin-nai-ult river is distinct from the present species. The *quinnat* is an exceedingly abundant fish in the Columbia, and is much larger than those mentioned by Dr. Cooper.—S.

† See RICH. F. B. A. Fishes, p. 219.

"It is this salmon which forms the main subsistence of the numerous hordes of Indians who live upon the banks of the Columbia, and it is known by the name of *quinnat* for one hundred and fifty miles from the mouth of the river. It attains a large size, weighing often from thirty to forty pounds."

Lewis and Clark seem to have confounded the present species and the *S. Gairdneri*. They say: "The *common salmon* are usually the largest, and weigh from five to fifteen pounds. They extend themselves into all the rivers and little creeks of this side of the continent, and to them the natives are much indebted for subsistence. They begin to run early in May. They are never caught with the hook, and we do not know on what they feed." * * * * * "The flesh of this fish, when in good order, is of a deep flesh-colored red, and every shade from that to orange yellow; when very meagre it is almost white. The roes are in high estimation among the natives, who dry them in the sun, and preserve them for a great length of time; they are of the size of a small pea, nearly transparent, and of a reddish yellow cast. They resemble very much, at a little distance, our common garden currants, but are more yellow."

The same travellers give an interesting account, in detail, of the manner in which the Indians, at that time, preserved the salmon for subsequent use, by drying it as in the manner already prescribed, and then, pounding it fine and packing in baskets, it is covered and "stacked" for use.*

A fish called by the Nisquallies the "*satsup*," corresponding in many particulars to the *S. quinnat*, ascends the tributary streams of Puget Sound at the same time that the *quinnat* does the Columbia. I have obtained no specimens of this. It is said to be a fine red-fleshed fish, of good flavor, and handsome general appearance.

Another salmon described by the Indians, as different only in size, ascends a few particular streams, and is very large. One of the localities where this fish is taken abundantly is at the fishery on Black river, a branch of the Dwamish. The species is called by the Nisquallies *To-o-odlt*, or *To-walt*, (Gibbs,) when fresh, and *Yo-ke*, or *Yo-ek*, when exhausted. The fresh run have a similar name applied to them by the Skadgetts, but are called *Skole-kum* when worn out and emaciated.

If identical with the spring salmon of the Columbia, I am inclined to think that the kind first mentioned as running up the affluents of Puget Sound will be found to be the *S. Gairdneri*, and that the large "*towalt*" will prove to be the *S. quinnat*. (Regarding the *towalt*, see other remarks under head of *S. confluentus*.)

Two imperfectly preserved skins of the *S. quinnat* are now contained in the Smithsonian collection. They were obtained from Mr. James Wayne, of Astoria, Oregon, and were, when fresh, without doubt, good specimens of the present species. For interesting notes on the species, see beyond, under the head of *General Remarks*, the information communicated by Augus McDonald, esq.†

* An extract from Lewis and Clark's Journal, describing this, is contained in RICH. F. B. A. Fishes, p. 218.

† Skins stuffed in as nearly natural shape as possible, and then varnished, would be highly desirable in our national collection. Labels giving the date of capture, Indian names, and sex, would add greatly to their value. Mr. Wayne's specimens, rough-dried as they were, have been, nevertheless, of the greatest advantage in studying the collection, as they have enabled us to decide with accuracy their identity with Richardson's species, and have formed a stand-point for studying the other kinds.

2. SALMO PAUCIDENS, Rich.

Weak-toothed Salmon.

Salmo paucidens, RICH. F. B. A. III, 222.—HERBERT, Sup. to *Fish & Fishing*, &c., 1850, 36.

SP. CH.—This species, described by Richardson from the notes of Dr. Gairdner, and from some fragments received, I have not yet been able to obtain. The specific characters deduced from Richardson's description are as follows: Dorsal outline nearly straight. Back of head and body bluish gray. Belly white. Tail and fins unspotted. Caudal forked. Teeth sparingly scattered, and feeble. °

They reach, according to Dr. Gairdner, an average weight of three or four pounds, and ascend the Columbia in the spring, in company with the *S. quinnat* and *S. Gairdneri*. If not the young of some other species already known, it must certainly be considered as distinct. Sir John Richardson, in F. B. A. Part III, p. 223, seems to think it the same as the "red-char" of Lewis & Clark, and supposes that the *S. Scouleri* may have also been thus named by those travellers. It is very difficult to determine what species they really alluded to. They say: "The red-char are rather broader in proportion to their length than the common salmon; the scales are also imbricated, but rather larger; the rostrum exceeds the under jaw more, and the teeth are neither so large nor so numerous as those of the salmon. Some of them are almost entirely red on the belly and sides; others are much more white than the salmon; and none of them are variegated with the dark spots which mark the body of the other."

As to the red color on the sides and belly, mentioned by those explorers, it is a mark of but little specific importance, as the females, and occasionally the males of the *S. quinnat*, *S. Scouleri*, *S. canis*, and probably those of several other species, become red, and sometimes purplish, after remaining some time in fresh water. Indeed, it is one of the first indications of the declining powers of the fish; and instead of being an evidence of high vital action, seems to be scorbutic in its character, forcibly reminding one of the redness caused in the human subject by the peculiar *cachexia* which produces scurvy and *purpura haemorrhagica*.

It seems, from this, not unlikely that the term "red-char" was applied to several species when in bad condition.

No Oregon salmon with which I am familiar agrees in the characteristics given of *S. paucidens*. There is, however, a kind of salmon which runs up the small rivers below the "Great Falls" (Dalles,) that is said to be very bright and silvery, and called, in consequence, the "white salmon" by the settlers, and a river which they ascend in great numbers by preference is named, from that circumstance, the *White-salmon river*. It is possible that this "white salmon" may be the *silvery-white salmon-trout* of Lewis and Clark, and perhaps identical with Dr. Gairdner's *weak-toothed salmon*.—(See beyond). Lewis and Clark say:† "Of the salmon-trout we observe two species differing only in color. They are seldom more than two feet in length, and much narrower in proportion than the salmon or red-char. The jaws are nearly of the same length, and are furnished with a single series of small subulate straight teeth, not so long nor so large as those of the salmon. * * * * One of the kinds, of a silvery white color on the belly and sides, and a bluish light-brown on the back and head, is found below the Great Falls, and associates with the red-char in little rivulets and creeks. It is about two feet eight inches long, and weighs ten pounds." * * * "The white kind found below the falls is in excellent order when the salmon are out of season and unfit for use."

° The young of most species of salmon have the tails forked. In the present case the small teeth, forked tails, and small size, may indicate the young of a species already known, or of which the adult is yet to be described.

† See quotation in RICH. F. B. A., Part 3, p. 163.—The italics are our own.

Sir John Richardson, in the *addenda* to the fishes in F. B. A., acknowledges the receipt of several specimens of three different kinds of trout from P. W. Dease, esq., taken in New Caledonia, (British Columbia.) One named *suppai*, he says, "resembles the young of an anadromous salmon. The scales are thin, flexible, and bright; the body is marked chiefly above the lateral line *with scattered crucial or crescentic black spots*, and the dorsal and caudal are thickly dotted with oval blackish marks in rows.* The fins generally, but the under ones especially, are small, and the latter appear to have been of a pale hue. * * * * The characters ascribed by Dr. Gairdner to the *T. tsuppitch* of the Columbia agreeing well with this fish, and the names being so similar, we may conclude that they are the same; and also that they belong to the species named *silvery-white salmon-trout* by Lewis and Clark." If it were not that Gairdner says distinctly that the fins and tail of the *T. tsuppitch* are *destitute of spots*, I should think it very likely that the *T. tsuppitch* is the same as the *suppai*, perhaps the same as the *silvery-white salmon-trout* of Lewis and Clark, which, it is not unlikely, is that now known to the Oregon settlers as the "*white salmon*," although it *may* be the *S. paucidens*. There are, however, differences which cannot readily be explained between Lewis and Clark's statements concerning the size and period of "season" of their *white salmon-trout* and Dr. Gairdner's notes concerning the *S. paucidens*. Lewis and Clark state that its weight is "*ten pounds*." Gairdner's *S. paucidens* "has an average weight of *three or four pounds*." Lewis and Clark say that their fish "*is in excellent order when the salmon are out of season*." Dr. Gairdner remarks that the *S. paucidens* "*is taken in company with the S. Gairdneri*" and "*the quinnat*," (the *common* salmon of Lewis and Clark.) The *white salmon* of the settlers runs up the rivers much later in the season than the spring salmon noted by Dr. Gairdner, and, if my memory serves me, chooses the same month as the *S. Scouleri*; in this respect agreeing with the *S. tsuppitch*, which, according to Dr. Gairdner, ascends with the "*ekewan*," (*S. Scouleri*?)

The salmon described by Girard in the General Report on Fishes, Pacific Railroad Reports, vol. 10, page 312, as the *Fario argyreus*, GRD., may, perhaps be the *S. paucidens*, RICH. It is an *unspotted* fish, *vide* PLATE LXX, Fig. 1.—(See remarks beyond, under head of *Salmo argyreus*.)

3. SALMO ARGYREUS, GRD.

PLATE LXX.—Gen. Rep. Fishes.

SYN. "*Salmo argyreus*, GRD." (*Mss.*) Pacific R. R. Rep. Gen. Rep. Fishes, 1858, p. 312.

Fario argyreus, GRD. Proc. A. N. Sc. Phil. VIII, 1856, 218.—IB. Pacific R. R. Rep. vol. VI, Part IV. p. 32.

As the description of this species given by Dr. Girard seems based on the characters of two *young, partially grown* fish, the specific characters thus deduced are probably much unlike those of the adult in good condition. For this reason no specific distinctions are given in this place; but, for the convenience of those interested in the subject, they are inserted in the accompanying note.

My own specimen, marked 580, Smithson. Cat. *Fishes*, was caught at the mouth of Nisqually river, (emptying into Puget Sound near Fort Steilacoom,) December 1, 1856. In my note book I find that its belly and sides were bright silvery; back, and top of head, silvery blue. Lateral line strongly defined. It was called by the natives *satsup*.

George Gibbs, esq., in a letter to me, says: "The *satsup* arrives at the mouth of the Puyallup about the end of December, and remains until spring. Towards that season, when the streams emptying into the sound are raised by the melting of the snow, the fish ascend them. This

* In a foot-note Richardson says: "In one specimen the spots on the fins are almost obsolete."

variety is the silver salmon, with *forked* tail. It is not very abundant, and does not run in 'schools.' Weight, 15 to 18 pounds; average, 13." He also mentions a small *unspotted* salmon, which the Indians say grows no longer than 18 inches.

The Indians probably confuse several species under the name of *satsup*, and perhaps consider all *silvery salmon*, with *red flesh* and *forked* tails, as one species.

NOTE.—Mr. Girard describes the species as follows. The color being taken from the preserved specimens are, of course, unnatural, and should have those given above substituted:

"SP. CH.—Body very much depressed, rather deep upon its middle region, and quite tapering posteriorly. Head moderate, constituting the fifth of the entire length. Jaws equal. Maxillary slightly curved; its free extremity extending to a vertical line drawn posteriorly to the orbit. Anterior margin of dorsal fin nearer the extremity of the snout than the insertion of the caudal fin. Bluish gray above; silvery along the middle of the flanks; yellowish beneath."—GIRARD.

4. SALMO TSUPPITCH, Rich.

SYN.—*Salmo tsuppitch*, RICH. F. B. A. Fishes, 1836, 224.—DEKAY, N. Y. Fauna, IV, 1842.—STORER, Synop 1846, 197 —

HERBERT, Supplem. to Fish and Fishing, 1850, 39. [Non *Fario tsuppitch*, GRD Pr. A. N. Sc Phil. VIII, 1856, 218.—IB. Gen. Rep. Fishes, P. R. R. Reports, 1858, vol. X, 310.]

? *White salmon*, SETTLERS ON THE COLUMBIA.

? *Silvery-white salmon-trout*, LEWIS AND CLARK.

FIGURES.—The plate (LXIX, figs. 1—4) in the Pacific Railroad Reports, vol. X, represents the *Salmo Gibbsii* and not this species.—(See remarks on *S. Gibbsii*.)

SP. CH.—Convexity of dorsal profile rising gradually to origin of first dorsal, declining from thence to the tail. Caudal forked. Head small, *exactly conical*, terminating in a *pointed snout*. Commissure of mouth very slightly oblique. Back of body and head studded with oval and circular spots; *sides and fins, including the caudal, destitute of spots*. Teeth minute and sharp; a single row on each palate bone, a very few on the anterior end of the vomer, and a double row on the tongue. [The foregoing description is deduced from Dr. Gairdner's notes in RICH. F. B. A. p. 224.]

The portions *italicized* in the above summary of specific characters, are those differing strongly from a correct description of the fish taken by Dr. Girard for this species, and described by me as the *S. Gibbsii*.

Dr. Gairdner says that this salmon ascends the Columbia with the ekewan, (late in August and during September.) The formula he gives for the *rays* is as follows: "Br. 13; P. 13; V. 10; A. 13; D. 12—0."

Sir John Richardson says that "a spine containing sixty-four vertebræ, and an under jaw with ten curved teeth in each limb," were all the bones that he could with any degree of correctness identify. (This was owing to the damaged condition of the specimens received.) The dimensions in detail of a specimen twenty-one inches in length are given by Dr. Gairdner. In this the anterior margin of the dorsal was one inch nearer the end of the tail than to the tip of the snout. The teeth were "equal in size with those of the *S. Gairdneri*, or perhaps rather larger."

I have myself never succeeded in obtaining this salmon, but am strongly inclined to the opinion that it is identical with the fish now known to the settlers on the Columbia as the "*white salmon*."—(See remarks on the *S. paucidens*.)

SALMO TRUNCATUS, Suckley.

Short-tailed Salmon; Square-tailed Salmon.

Salmo truncatus, SUCKLEY, Ann. N. Y. Lyc. Dec. 1858.

Typical specimen No. 1134, Smithsonian collection.

SP. CH.—Body fusiform; dorsal profile moderately arched; anterior margin of dorsal fin *much* anterior to a point equidistant between the nose and the insertion of the tail; head small; jaws fully provided with small teeth; tail small, its free

margin, when extended, being almost straight, having a very faint tendency to lunation; scales generally large. Colors of the fresh run fish: back of head, back, dorsal and caudal fins, bright blue, spotted on the head with roundish, on the fins with oval spots of black; the blue of the back is silvery, that of the head and fins darker; lower parts silvery white, this color extending about an inch above the lateral line and merging itself irregularly into the color of the back; no spots below the lateral line, which is faint and of a bluish dusky color; lower fins pale and unspotted, their tips somewhat darkish.

The specimen upon which the description of the present species is based was an adult female, obtained by the writer in the Straits of Fuca in February, 1857. Its body was fusiform, in its dorsal profile resembling somewhat the *S. quinnat*, Rich. It was, however, more slender than that species, and differed greatly in the form of the head and tail, besides having other marked characteristic distinctions.

The following brief diagnosis may serve to assist in distinguishing the present species from its nearest relatives found in the same region: From *S. quinnat*, Rich., it may be known by the much smaller head and rounded, not pointed, snout. The smooth triangular projection extending in front of the *symphysis mentis* of that species is also wanting. The tail of the adult *S. quinnat* is very deeply lunated, almost forked; that of the present species is so abruptly terminated that it has suggested the specific name applied, the end being almost as abruptly truncated as if chopped off with a large knife. In this respect it resembles the adult male of the *Salmo trutta*, Lin., as figured in Agassiz's *Histoire Naturelle des Poissons d'eau douce*, *Planches, Livraison I, Tab. VII.*

Another difference is in the greater size and thickness of the *S. quinnat*, which not unfrequently attains a weight of thirty or forty pounds, whereas the present fish is usually found not exceeding ten or twelve pounds, and generally much less; and its common length, when full grown, rarely exceeds thirty-two inches. From the *S. Gairdneri*, of Richardson, (not of Girard, see pl. LXXI, Pacific Railroad Reports, which is drawn from the young of some other species,) it is more difficult to be distinguished, both having many characters in common. It is possible that hereafter, upon accurate comparison being made with numerous specimens, they may be found identical. In studying the specimens at present in the Smithsonian collection we were obliged to confine ourselves to the examination of two imperfectly dried skins of the *S. Gairdneri* and one of the present species, which as yet are the only representatives of those species contained in the collection. The following differences, however, were found: the *S. truncatus* has the head smaller and shorter; tail neither so wide nor so long, and more spotted; teeth in the lower jaw more numerous, but smaller; muzzle and chin more pointed; body posterior to anal fin more slender. The lengths of the three skins were much the same, those of the *S. Gairdneri* being slightly greater. The teeth of the latter are larger and more scattered, being in one specimen 9.9 and in the other 10.10 on the arms of the lower jaw. Those of the *S. truncatus* have 14-16 on each side, and, although in line, were dispersed in a pair-like manner—i. e., every other interval being greater. This pair-like disposition of the teeth is not seen in the *S. Gairdneri*.

From the *S. Gibbsii* it may be known by its greater size and much brighter colors, proportionally smaller tail and fewer spots. The dental arrangement, however, is much the same, barring the absence in the *S. Gibbsii* of the pair-like distribution of the teeth already spoken of. This peculiar dental arrangement may be accidental in the specimen preserved, and has, therefore, not been included among the specific characters of the species. For the same reason the well marked presence of a double row of teeth on the anterior portion of the vomer was not

included. Indeed, the specimens of the species of Salmonidæ from the Pacific coast of America, now in the Smithsonian collection, vary so much in regard to the arrangement of the teeth on the vomer that I have no hesitation in rejecting, for the present, the genus *Fario* of Valenciennes. It is very probable that the arrangement and number of the vomerine teeth depends greatly on the *age* of the individual, and may also ordinarily vary much in individuals otherwise alike.

The female obtained by me from the Straits of Fuca had a very short, small head, forming about one-thirteenth of the total length of the fish. Female salmon usually have smaller heads than the males, but I do not remember ever seeing those of any species so small, compared to the total length of the body, as in the present instance. The under jaw was received nicely and accurately within the upper. The labial, inferior maxillary, and vomerine teeth are very uniform in size, and quite small, those of the intermaxillary larger, but still small.

The name given to the species by the Klallam Indians is *Klutchin*.

While residing at Puget Sound I collected the following information from the Indians respecting the salmon known to the Nisquallies as the *skwowl*, which I consider identical with the *Klutchin* of the Clallums, a specimen of which has served as the typical example of the present species. This fine salmon is second to none in beauty, size, or excellence. It arrives in the bays and estuaries of Puget Sound about the middle of autumn, and towards the first of December commences to run up the larger rivers emptying into the sound. Their ascent of these streams continues through December and January. This arrival of the species in fresh water is not as simultaneous, neither do they arrive in such great numbers at any one time or in "schools," as is the case with the *skourtz* and several other species, but the "run" being somewhat more "drawn out" affords a steady moderate supply to the Indians during its continuance. In the fall and winter large numbers are taken by the Indians from the salt water by trolling with hook and line in the bays and coves of Puget Sound. The bait used is generally a small kind of herring, a little larger than the common sardine of commerce. After entering the rivers it is taken by the Indians in nets, traps, baskets, &c., and also by spearing.

Its flesh when cooked is of a beautiful salmon red, and, as a table delicacy, when fat, as it generally is when "fresh run," ranks equally with that of the *S. salar*, the *satsup*, or the *quinnat*. The Cowlitz river, (a branch of the Columbia,) situated not more than sixty miles from the head of Puget Sound, has salmon of various species entering it at regular periods annually. Indians of intelligence have told me that the species under consideration is the only kind common to both these waters. How far we can place reliance on their statements is difficult to determine.

The distinguishing characters which strike the eye at a glance are its *short* and *small* head, the small weak teeth in the jaws, and the shape of its tail, which is *truncated*—*not forked*.

I obtained a fine specimen of the *Klutchin*, at New Dungeness, Straits of Juan de Fuca, during the last week of January, 1857. The measurements were as follow :

Upper measurement.		Lower measurement.	
	Inches.		Inches.
Total length.....	29 $\frac{1}{4}$	Nose to tip of tail, total length.....	30 $\frac{3}{4}$
Head from tip of snout.....	3 $\frac{1}{2}$	Nose to pectoral fin.....	3 $\frac{1}{2}$
Nose to first dorsal fin.....	12 $\frac{1}{2}$	Nose to abdominal fin.....	14
Nose to adipose dorsal.....	22	Nose to ventral.....	20 $\frac{3}{4}$
Length along the lateral line from nose to		Nose to base of lowermost caudal rays,	
base of tail.....	28	about.....	27

	Inches.		Inches.
Length of caudal fin along its middle	2 $\frac{1}{8}$	Girth just anterior to caudal	6 $\frac{1}{8}$
Length along the lateral line from nose		Adipose fin thick and fat	
to the end of the middle of the tail . .	29 $\frac{3}{4}$	Its length posteriorly	1
Width of base of dorsal fin	3 $\frac{1}{4}$	Dorsal, length <i>superiorly</i> (anteriorly)	3 $\frac{1}{4}$
Width of base of adipose fin, nearly	$\frac{3}{4}$	Ventral, length <i>inferiorly</i> (anteriorly) . . .	3 $\frac{1}{4}$
Width of base of pectoral, about	1	Rays—Pectoral	13
Width of base of abdominal, about	$\frac{7}{8}$	Abdominal	11
Width of base of ventral	2 $\frac{3}{4}$	Ventral	13
Width of outstretched tail along its free		Dorsal	12
margin. (Line of end of tail when thus		Caudal	26
stretched almost straight)	7 $\frac{3}{4}$	Branchial	12.12
Girth just anterior to pectorals	11 $\frac{3}{4}$	The caudal rays in the middle divide each	
Girth just anterior to abdominals	15 $\frac{1}{2}$	into four fasciculi, which are again subdivided.	
Girth just anterior to ventrals	11		

Colors.—These were noted six hours after the death of the fish—they were still quite bright and silvery, and are given under the head of *specific characters*.

The lower jaw was received nicely and accurately within the upper. *Sex* not noted.

It is possible that this species may prove identical with the next. The fish resemble each other closely, and many specimens of both species (or varieties) will be required to determine the question properly.

George Gibbs, esq., writing from Puget Sound, after alluding to several other species of salmon, says:

“Besides the above, Swan caught, in 1854, two of the square-tailed salmon; only one Indian had ever seen them before. The rest said they were strangers (*heloima*.) The scales came off very easily on handling.”

Again he says: (this time writing from the Columbia river.)

“The *square-tailed salmon* has the body thicker where the tail joins the body than is the case in the common salmon (*S. quinnat.*) Belly silvery white; back not as blue as in the other species, (? *S. quinnat.*) and marked with numerous small roundish spots. *Tail cut sharp across* and not forked.”

In the following remarks Mr. Gibbs perhaps refers to the present species, or else to one of the other winter kinds which had not yet finished its sexual duties before the arrival of the *S. quinnat.*

“In 1853, at Astoria, I purchased the first salmon March 10. It was brought from Clatsap, where several had been taken previously. It was not in good order, and weighed but 13 lbs.; a female, with eggs, half grown. Sides somewhat discolored, as is common in the fall. Fish more slender than that of the usual spring salmon. I was doubtful whether its different appearance arose from it being a variety, or out of season. Afterwards, April 20, I find another note that this species was still taken, while the true spring salmon were in season. It reached 20 lbs. in weight.”

At another time Mr. Gibbs writes: “The *skwowl* is taken ‘fresh’ (fresh run?) late in *January*, at Port Discovery and Hood’s Canal,” (Puget Sound.)

SALMO GAIRDNERI, Rich.

Gairdner's Salmon.

SYN.—*Salmo Gairdneri*, RICH., Fauna B. A., Fishes, 1836, 221.—DEKAY, N. Y. Fauna, iv, 1842, 243.—STORER, Synop. 1846, 196.—HERBERT, Suppl. to Fish and Fishing of the United States, 1850, 34. (Non *Fario Gairdneri*, GRD. PR. A. N. Sc., Phil. viii, 1856, 219; *sive* IBID, Pacific R. R. Reports, vol. vii; et Gen. Rep. Fishes; p. 313, PLATE, LXXI, fig. 1—4. *)

? *Queachts*, CHINOOK.

SP. CH.—[Based on data given by Richardson, and on the examination of two dried skins in the Smithsonian collection.]—Profile of dorsal outline nearly straight; tail terminating in a *slightly semilunar outline*. Ventrals correspond to commencement of dorsal, and adipose to end of anal. Jaws fully armed with strong hooked teeth, except a small space in centre of upper jaw. Vomer armed with a double row for two-thirds of its anterior portion. Back of head and body, bluish grey; sides, ash grey; belly, white; caudal, spotted with oval dark spots; snout, rounded, (much more blunt than in *S. quinnat*.) Head, short and comparatively broad. Under fins light colored.

This salmon differs from the *S. quinnat* in the rounded not pointed muzzle, in lacking the sharp, toothless, triangular prolongation of the lower jaw, anterior to the teeth; in its shorter and thicker head, in being more slender, and in having the dorsal outline more straight. It also differs in its *slightly lunated* tail, in having the rows of teeth on the tongue *diverging* posteriorly, and having but 12 or 13 branchial rays. The teeth generally are smaller and of more uniform size than those of the *S. quinnat* of equal condition. The lips in the dried specimens do not seem as thick as in the last mentioned species, the teeth thus appearing nearer the outside margin.

Dr. Gairdner says that the only traces of variegated markings found on this fish are "a few faint spots at the root of the caudal." In the Smithsonian collection there are, at present, two dried skins which, upon careful comparison with Sir John Richardson's description of the present species, agree in so many respects, that we have no doubt of their identity with it. They were obtained recently from Mr. James Wayne, of Astoria, Oregon, and were caught at the same season of the year that Dr. Gairdner mentions that it is common in the Columbia. The only marked discrepancy, which I have found between these specimens and Dr. Gairdner's description, is in his statement as above, of the *absence of markings*. In Mr. Wayne's salmon the tails were *profusely spotted* with elliptical and roundish spots of a dark color. As before stated, I do not consider the occasional *absence* of spots is of specific value, but simply a mark of variety.

Richardson says: "In this species the gill-cover resembles that of *S. salar* still more strongly than that of the *quinnat* does, the shape of the sub-operculum, in particular, being precisely the same with that of *salar*. The teeth stand in bony sockets like those of the *quinnat*, but are scarcely so long. Those of the lower jaw and intermaxillaries are a little smaller than the lingual ones, and somewhat larger than the palatine or labial ones. The tongue contains six teeth on each side, the rows not parallel as in the *quinnat*, but diverging a little posteriorly. The pharyngeals are armed with small sharp teeth; the numbers of the teeth (excluding the small ones which fall off with the gums) are as follows: *Intermax.*, 4—4; *labials*, 21—21; *lower jaw*, 11—11; *palate bones*, 12—12; *vomer*, lost; *tongue*, 6—6. When the soft parts are

* Plate LXXI seems to be taken from the young of some species either not yet recognized, or hitherto undescribed. It is possible that the fish may have been a very young *S. Gairdneri*; unless, as has been suggested, the number of rows of vomerine teeth be either variable, according to age or individual development, a wide difference would seem to exist between Dr. Girard's specimen, which he includes under the genus *Fario*, (and therefore has but a *single* row of teeth on the vomer,) and the description given by Dr. Gairdner of the dental arrangement of the present species, which has a double row of teeth for two-thirds of the anterior portion of the vomer.

entirely removed, the projecting under edge of the articular piece of the lower jaw is acutely serrated, in which respect this species differs from all the others received from Dr. Gairdner. There are 64 vertebræ in the spine,"—(RICH. in F. B. A., p. 222.)

Dr. Gairdner says that this species ascends the Columbia in June, "in smaller numbers than the *quinnat*, in whose company it is taken. Its average weight is between six and seven pounds." The great difference in size is another strongly marked distinction between this species and the *quinnat*. Dr. Gairdner also gives the dimensions of a fish having an extreme length of 31 inches, in which the length from the snout to the anterior margin of the dorsal was 12 inches. In his measurements of a *S. quinnat* of 30 inches extreme length, the distance between the same points was 13 inches. According to this it seems that the dorsal fin in the *quinnat* is placed comparatively a little further behind.

The two dried skins examined by us are so much shrivelled that the relative distances between the fins cannot be accurately determined.

The *S. gairdneri* differs from the *paucidens** in having larger teeth, in attaining a much larger size, and in not having a *forked tail*.

In 1856 we noticed a salmon which had been caught at an Indian fishery on Green river near Puget Sound, which seemed to have been either a variety of the present species or nearly related to it. It was more slender than the *Towatl*, (? *quinnat*), and although it had good flavor and seemed in excellent condition, its flesh was *white*. This fish was bright and silvery externally, and appeared to be fresh run from the sea. It was about 28 inches in length and quite slender.

The Puget Sound Indians take a salmon in summer which is known to the Skadgetts as the *yoo-mitch*, and to the bands speaking the Nisqually dialect as the *satsup*. This they consider to be the best of all the kinds of salmon which they catch. It commences to run up the fresh water streams about June 15, and continues ascending until about the middle or end of August. As the period of arrival of this is so much like that of the *gairdneri* on the Columbia, we are inclined to consider them identical, and regret exceedingly that we preserved no specimens for study and comparison. The flesh of the kind—whatever it may be—is of a beautiful salmon-red, and in general estimation for the table, is the favorite of both whites and Indians. When exhausted and emaciated from spawning, it is called, in common with several other species, *Yoke* or *Yock*.

SALMO GIBBSII, Suckley.

Columbia Salmon Trout; Gibbs's Salmon.

SYN.—*Fario tsuppitch*, GRD. in Proc. Acad. N. Sc. Phil. viii, 218, 1856.—GRD. Rep. on Fishes, U. S. P. R. R. Surveys, 310, 1858. [Non *Salmo tsuppitch*, RICHARDSON.]

S. Gibbsii, SUCKLEY, Annals N. Y. Lyceum, 1858.

Black-spotted Salmon-trout, LEWIS & CLARK.

FIGURES.—The typical specimen of the present species is figured as *F. tsuppitch*, in the Pacific R. R. Reps., *Fishes*, Pl. LXIX.

SP. CH.—Body elongated, compressed, fusiform in profile; dorsal profile but slightly arched; snout rounded, the jaws sub-equal; maxillary gently curved, dilated posteriorly, and extending to a vertical line passing slightly behind the orbit; anterior margin of dorsal nearer the extremity of the snout than to the insertion of caudal fin; colors of the head and back, in the fresh specimen, rich dark olive green, profusely dotted with roundish black spots, the scales in certain lights showing bright silvery reflections; sides below the lateral line are usually unicolor, of a yellowish white; inferior fins unspotted; tail and upper fins yellowish olive, *profusely* spotted with round and oval spots of black, each spot being from one to two lines in

* This is, if we admit the *paucidens* to be a species, the characters of which are based on the description of an adult.

diameter, and completely isolated from the others, *not confluent* as in some other species; caudal fin moderately lunated, *not forked*; head small; teeth small, and very numerous, especially on the labials; length of the full grown adults rarely exceed 2 feet.

Hab.—The Columbia river and its larger affluents. The species is apparently not anadromous, but seems to remain in the fresh waters throughout the year.

The typical specimen upon which the foregoing description is based is a single skin contained in the Smithsonian collection, Catalogue No. 940, that of a female, obtained by the present describer at Fort Dalles, Oregon, April 5, 1855. The species is known to the Walla-Walla Indians as the *Shoo-shines*, and to the Wascos by the name of *Ic-kwan-eek*.

Mr. Girard, taking the specimen for the *S. tsuppitch* of Richardson, figured and described it as belonging to that species. Upon his attention being called to several marked discrepancies between the account given by Sir John Richardson of the *S. tsuppitch* and certain characteristics of the specimen from Fort Dalles, he at once coincided with me in considering the two species distinct. According to Richardson, the *S. tsuppitch* has the dorsal, anal, and caudal fins *destitute of spots*, and the tail *forked*. The present fish, on the contrary, has the tail but *moderately lunated* at its extremity; and the dorsal fins and tail are *profusely spotted with black*. These prominent differences, besides many others less striking, have been deemed sufficient to settle the question of non-identity of the two species; and as no recorded description seems to refer to the present salmon, it is now presented as a new species under the name *Salmo Gibbsii*, in honor of my valued friend George Gibbs, esq., geologist to the Northwestern Boundary Commission, and for many years a resident of Washington Territory. To Mr. Gibbs more than to any other individual am I indebted for rare specimens in all branches of natural history, and especially for information, aid, advice, and encouragement while endeavoring to elucidate the history of the Salmonidæ of the northwest coast.

This salmon is obtained during the winter and early spring months at Fort Dalles, Oregon. It is also found during the summer in the Yakima, John Day's, and other rivers, emptying into the Columbia. In the fall of 1855 I obtained a fine specimen of a fish resembling this species from Boisé river, one of the tributaries of Lewis's Fork. Its flesh is good for the table, and the size renders it convenient for culinary purposes, as it rarely exceeds five or six pounds. Most individuals have a broad reddish band or blueish along the sides, commencing at the middle of the opercula, and extending to near the base of the tail. This band is apparently subcutaneous, and may exist only in individuals not in prime condition.

Dr. Cooper says: "This fine fish, known as mountain and salmon trout, is quite plentiful in the rivers east of the Cascades in autumn, when we saw many of them caught by the Indians. They did not bite at the hook, though I caught two other species very easily, using grasshoppers as bait. These were all lost, with other fish obtained there, on account of the want of good alcohol, as before mentioned. Though some of our hunters said that this fish is confined to the east side of the mountains, I saw one caught in Puget Sound in March, 1855, which I thought precisely the same. Its peculiar shape would be hardly mistakeable."

Dr. Cooper's authority for the existence of this salmon at Puget Sound is undoubtedly good; yet, nevertheless, I am surprised that, during a much longer residence in that vicinity, I never noticed this species, although I paid especial attention to the *Salmonidæ*.

Description of a female salmon caught September 22, 1853, on a branch of the Yakima river, Washington Territory, by George Gibbs, esq.

	Inches.		Inches.
Total length.....	24	To anal fin.....	17
Tip of nose to first dorsal fin....	10½	Base of anal fin.....	2
Length of base of dorsal fin.....	2½	To base of tail.....	22
Nose to adipose fin.....	17¾	Girth before dorsal fin.....	10½
Length of adipose.....	½	Girth before tail.....	4½
Nose to root of tail.....	21¼	Length of head.....	4
End of lower jaw to pectoral fin.	4¼	Circumference of head.....	9
Base of pectoral fin.....	¾	From eye to eye over back of head	2
To abdominal fin.....	12	Length from orbit to nose.....	1½

Form slender, rounded; back and head dark olive, with black spots; sides silver gray, with purplish and green lights; belly silver white; Iris pale gold; head short, thick; jaws equal length; spines in dorsal fin 14 inches; a distinct lateral line; eggs nearly matured.

A hunter told Mr. Gibbs that this fish is found altogether above the Cascades of the Columbia, and that they grow to one-third larger size.

SALMO CONFLUENTUS, Suckley.

Typical specimen in Smithsonian collection, Fishes, No. 1135.

SYN.—*Salmo confluentus*, SUCKLEY, Ann. N. Y. Lyc., December, 1858.

SP. CH.—Male: Form, stout; dorsal profile rising to a point just anterior to dorsal fin, then rapidly tapering to tail; dorsal, adipose and caudal fins profusely spotted; caudal broad and moderately lunated; adipose opposite anal, and much elongated; spots along the back and sides, generally linear, or V-shaped; others irregular, (but few round,) and covering from two to five scales; the most common cover three scales, and are about half an inch in length; fins on under parts unspotted, as also all parts beneath the lateral line.

A triangular bare projection of the chin anterior to the front teeth, as in the *S. quinnat*; scales scarcely as large as those of *S. truncatus*. Teeth of irregular size, and not so closely disposed on the arms of the jaws and labels as in *S. gairdneri*; middle of dorsal fin nearly opposite a point at the middle of the total length.

Differs from *S. quinnat* in having the tail but moderately lunated at the extremity, that of the latter being so deeply cut out as to be almost forked.

Hab.—Northwest coast of America, entering the rivers for spawning purposes during the spring, and continuing throughout the summer.

The typical specimen, from which the foregoing description was taken, is a dried skin, now in the Smithsonian collection, procured by the present describer from the Puyallup river, near Fort Steilacoom, Washington Territory, September 27, 1856, and called by the Indians who saw it *To-oh-odlt*. The Indians seem to apply the same name to another species of salmon, as I have heard of a gigantic kind, only found in certain localities, which is also called *To-oh-odlt*. The colors of the specimen procured—an adult male—were evidently much changed by long residence in fresh water, and the exhaustion consequent upon procreation. This was rendered evident by the altered appearance of the jaws and teeth, as well as by the lean condition of the fish. The colors, as they appeared, were as follows: Upper parts, dingy olive-green, profusely spotted with diagonal and confluent spots of dark brown, or black. Lower parts dingy yellowish white, unspotted, but tinged with a reddish band along the flanks. Dorsal, adipose, and caudal fins dark yellowish green, spotted profusely with dark brown or black.

The examination of the dried skin shows branchial rays 13.14, as near as can be counted.

The condition of the specimen is such that no reliable statement can be given of the number of fin-rays. Length of skin, 29 inches. Insertion of anal fin about $2\frac{3}{4}$ inches in length. A single tooth on the anterior portion of the vomer. Intermaxillary projection strongly decurved in the dried skin.

George Gibbs, esq., obtained the following information regarding this salmon from Mr. John Swan, one of the proprietors of the fishery at the mouth of the Puyallup:

"*Towall*.—These come every fall, with the *Shonquid*, (*S. Scouleri*.) They are a speckled salmon, with small black spots, more distinct than those of the *Schedad*, (*Satsup*?) The scales are of a duller hue. All the others have bright scales when in salt water, but change on entering the fresh. These last are always dull. They are the largest of the Sound salmon, and run twenty to twenty-five pounds, averaging fifteen. They differ from any of the rest."

NOTE.—An alcoholic specimen in the Smithsonian collection, marked 1136, is apparently a female, of some nearly allied species, from the same general region of country. The head and skin are preserved, the flesh having been removed. In general appearance it much resembles the present species, but the spots are more numerous, and round, not confluent.

SALMO SCOULERI, Rich.

Hooked-nosed Salmon; Fall Salmon.

SYN.—*Salmo scouleri*, RICH. Faun. Bor. Amer. III, 1836, 158, and 223; pl. xcvi.—DEKAY, N. Y. Fauna III, 1842.

GIRARD, Gen. Rep. Fishes, p. 305.—HERBERT, Fish and Fishing, &c., Suppl. 1850, 37.

Salar scouleri, VALENC. in Cuv. and Val. Hist. Nat. Poiss. XXI, 1848, 345, 242.—STOREY, Synops. 1846,

194.—GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 217.

? *Salmo lycaodon*, PALLAS, Zoog. Ros. Asiat.

FIGURE.—RICH, F. B. A. III, 1836; pl. 93.

SP. CH.—*Male*.—Profile much arched, the convexity rising from nape to dorsal fin. The body at that point is thick, tapering from thence to the caudal. Intermaxillary prolongation strongly decurved, and armed with large hooked teeth. Under jaw armed with a dilated and slightly incurved knob, similarly provided with strong teeth. The teeth on the sides of both jaws are strong, and very irregular in size or disposition, and extend almost to the angle of the commissure. Teeth on the vomer, present or absent, varying in this respect in different specimens. Caudal fin moderately lunated, the degree varying according to age.

Colors.—In recent specimens fresh from the sea we find a silvery lustre; not, however, as strongly marked as in the *S. gairdneri*, *S. quinnat*, and other species. The ground color of the back is lead color, and that of the belly white, or yellowish white. The back and sides are unspotted.

Female.—The fresh run female differs in having symmetrical jaws, destitute of elongated intermaxillary, or of the incurved knob on the lower jaw.

Richardson gives the branchial rays as 12–13. Those of the seven specimens in the Smithsonian collection have from 12 to 14 on either side. Ventral appendages long.

Richardson says: "The *palatine* and *vomerine* teeth equal the posterior ones on the lower jaw in size, and are implanted in double rows; there are none on the anterior knob of the vomer." Of the seven specimens we have, four have no *vomerine* teeth, two of the others (females) have a very minute single tooth about the middle of the bone, and the other has a row of rather strong teeth upon it. The latter having dried with the mouth closed, it is difficult to ascertain their exact number or arrangement.

The heads of the males which are contained in the collection have a membrane stretched across the roof of the mouth in its anterior third; above it there is a cavity opening posteriorly and terminating anteriorly in the maxillary protuberance, forming a *cul de sac*.

In speaking of the prolongation and incurvature of the extremities of the upper and lower jaws, Sir John Richardson says that they are "said to be peculiar to the male *after* spawning."

From my own observation while stationed on the northwest coast, and from information received from others, I feel justified in pronouncing this an error, as I have seen the adult male while *fresh run* and *silvery*, with these remarkable characteristics strongly developed months—certainly weeks—*before* the spawning season. It may be, however, as suggested by Dr. Cooper, that old males that have in previous seasons entered the rivers for spawning purposes, having afterwards recuperated in the salt water, do return with this peculiar formation of the jaws and mouth. This subject has, unfortunately, as yet, been but little examined. I was frequently told by fishermen, Indians, and others, that the *females* lack these peculiarities, thus confirming Dr. Scouler's statement. If such is the case it will account for Dr. Cooper's remark, that "the amount of hooking of the nose seemed very much independent of size or season." In my field-notes regarding this species I find the following remarks: "The *skowitz* of the Nisquallies, or hooked-nosed salmon of the *whites*, is a very common kind. *Adult males* of this species have always, even when *in excellent condition and fresh run from the sea*, a *decurved cartilaginous process from the symphysis of the upper maxilla*, behind which the point of the lower jaw is received. The females (at least when *fresh run*) are *without* this appendage. In the absence of the hooked snout in the females this species is like the *S. hamatus*, as described in the annexed quotation. The strong teeth found on the intermaxillary protuberance of the male will afford a subject of comparison for the field-observer, when comparing the present species with the worn-out males of the *S. quinnat*."

In the Fauna B. Americana, Part III, p. 141, Sir John Richardson makes the following remarks upon the Lapland *Salmo hamatus*, which are interesting in the present connexion because thought by him to come nearest to the *S. scouleri*, (see foot note to page 160 of the same volume;) he says: "As I have not seen an authentic specimen of the *Salmo hamatus* of the Régne Animal, I am unable decidedly to controvert M. Agassiz' opinion that it is merely a nominal species, founded upon a change of form which takes place in the old males of *Salmo salar*; but the evidence I have gleaned from authors induces me to follow Cuvier in considering it to be quite distinct." * * * * * "The following passage, quoted from the Lachesis Lapponica, tends to prove not only the northern range of the *Salmo hamatus*, but also that the *hook of the lower jaw is developed even in young fish*; but the old males of the common salmon that we usually see in the Nith, and some other British rivers, have a comparatively slight hook. 'Here,' in Lulean Lapland, 'the common salmon is found with the under jaw occasionally hooked. I inquired whether this *variety* was esteemed a distinct species, or whether a difference arising from age; both of which questions I was answered in the negative. I was shown a fish of the *smallest size*, which had in proportion *as large a hook to the lower jaw as the largest*. I inquired whether the hooked salmon were furnished with roe or milt. I was answered that they had always *milt*. On opening seven of them I found this verified; whereas four salmon which were not hooked had roes. The hooked or male salmon is so called because the point of its lower jaw is bent inward and has a taper form, resembling a finger, while, on the contrary, the upper one is formed with a cavity to receive the point, embracing it like a sheath for about half its length.'"

When worn out, all specimens have the hooked snout, but in the female I judge that this is only owing to the absorption of the fatty cushions along the upper jaw, whereas in the *male* the original characteristic is exaggerated by emaciation. The *skowitz* is a very abundant species, and affords, in fact, the principal salmon harvest to the natives, who dry vast quantities for winter consumption. This species commences to run up the fresh water streams emptying into

Puget Sound in September, and continues arriving until near Christmas. During the months of January, February, and March, they are found abundantly in small shallow brooks and streams tributary to the larger rivers. At this late period they are much emaciated, owing to their exhaustion from breeding and from months of abstinence, they being said not to eat after entering fresh water; and their flesh, when cooked, is rank and ill-flavored. During the month of April they suddenly disappear, probably returning by the spring floods to salt water, although the Indians say that but few return to the sea.—(See General Remarks.) The flesh of this fish, when fresh from salt water, the individual being fat and in good condition, is of a very pale yellowish "salmon" color. This color soon changes into pinkish yellow, and, when the fish is worn out, to yellowish white.

Under the head of *S. Scouleri* Dr. Cooper says:

"I observed, in overhauling several hundreds of these salmon at different times, that they varied exceedingly in the form of their upper jaw and the size of their teeth, and came to the conclusion that those commonly distinguished as the 'dogmouth' were only very old specimens of the same. The amount of hooking of the nose seemed very much independent of size or season, but was found of every shade and degree in fish caught at the same time.

"None, however, except those apparently full grown, showed it at all, and after attaining a length of four feet they show no other sign of increased age.

"We found the same varieties in size and in the shape of the nose in salmon caught 350 miles up the Columbia, at the mouth of the 'Pisquouse' river, though, as before mentioned, those seen in the Okanagan were all of smaller size."

Mr. George Gibbs, in speaking of the skowitz, ("skowquid,") says:

"This is the salmon that runs in such immense schools in the sound, and is caught and salted there. The head of this variety is narrower than that of the former, and it is taken in seines. Messrs. Swan & Riley have taken as many as 3,000 skowquid at one haul. The *males* have a somewhat crooked head and large teeth, the females fine wiry teeth. They last until the latter part of December, and are most numerous in the years when they arrive earliest."

A fish said by the Indians to be much like the skowitz, but fatter and of finer flavor, enters the sound in company with the latter species, but does not pass up further than Whidby's island. It is called by the Skadgetts *sky* or *skai*.

Some remarks on the economic value of the *S. Scouleri*, compared with that of other kinds of western salmon, are included in the General Remarks of the present report.

After carefully reading the notes by Dr. Scouler on the salmon of Observatory inlet, contained in Richardson's work, I am convinced that the salmon there obtained is identical with the *skowitz* found on Puget Sound, and nearly related to, if not identical with, Dr. Gairdner's "*ekewan*." Some differences exist, however, between Dr. Gairdner's statements regarding the latter fish and the information which I obtained concerning the *skowitz*. He says that the *ekewan* "averages thirty pounds in weight." Mr. Gibbs says "the *skowitz* averages six pounds." My own impression is, that the *male* skowitz will average twelve pounds, and the females much less.

The study of this particular species, or perhaps *group*, of salmon presents many points requiring further investigation. Although, as Dr. Scouler suggests, the *S. Scouleri* "comes nearest to the *gorbuscha* of Kamschatka," I do not by any means think them identical. If the *gorbuscha* is the same as any of our species frequenting the waters of Puget Sound or the Columbia, I think it will be found identical with the *Salmo proteus* of Pallas, described in this

report, a species known, *par excellence*, to the inhabitants on the northwest coast as the "hump-backed salmon," which enters the rivers on alternate years. The *S. Scouleri* has a tendency towards a hump, and might be called the "hump-backed salmon" if we had not a species having that character so much more exaggerated. Besides differences in this respect, there are other strong ones in the number and arrangement of the teeth, size of scales, color, total length of fish, &c.* The *gorbuscha*, according to Pennant, never exceeds a foot and a half in length.

Dr. Scouler, *in lit.* to Sir John Richardson, says of this salmon: "This arm of the sea [Observatory inlet] was frequented at the time by such myriads of the salmon that a stone could not have reached the bottom without touching several individuals—their abundance surpassing the efforts of the imagination to conceive. The little brook that empties itself into the inlet was swarming with the fish ascending to spawn, and in the course of about two hours we killed sixty with boarding pikes. The hump before the dorsal fin consists of fat, and appears to be peculiar to the males, who acquire it after the spawning season, when their snouts become elongated and arched."

From the wording of the last sentence I am inclined to think that *two distinct kinds of salmon were entering the rivers at the same time*; these being the *S. Scouleri*, of which he sent a specimen which was described and figured by Sir John Richardson, (from which description and figure there is no difficulty in proving its identity with the *skowitz* of Puget Sound,) and the hump-backed salmon or *huddo*. In Puget Sound the two species are found arriving at the same season and months—the *huddo*, however, only coming in alternate years. Perhaps Dr. Scouler, in confounding the two species as one, made notes on both, part of which apply only to the hump-backed species; and having preserved specimens of the *S. Scouleri* alone, confusion was created not only in Sir J. Richardson's pages, but in the minds of others studying the subject. Confusion, however, in regard to our northwestern salmon is perfectly pardonable, as we ourselves can testify.

Dr. Scouler again says, [this time probably referring to the true *S. Scouleri*:] "According to the best of my remembrance the color of the belly is white, inclined to yellow, and the back is of a bluish leaden color. Nothing can be more different than the appearance of the two sexes during the spawning season. The female is round and beautiful, *with the jaws of equal length*; while the male is compressed laterally, and has a *long, arched snout with powerful teeth*." [The *italics* are our own.] Dr. Scouler again remarks: "I am unable to say whether any return to the sea or not; or whether the large teeth drop, and the incurvated snout returns to its former dimensions. The females *want* the large teeth, and so do the males before spawning, at least I saw none with large teeth in the Columbia in April or May. We left that river in June, and did not return until September."

The teeth of all salmon *apparently* grow as the fish becomes emaciated. This is caused much by the shrinking of the "gums," produced by the absorption of all superfluous fat. The Doctor evidently again confounds distinct species, mistaking the *spring* kinds (*S. quinnat* and *S. Gairdneri*) for this species. At the time he was in the Columbia (May and June) there were no individuals of the present species to be found. September, the month in which he returned, is the time when the *S. Scouleri* comes from the sea in vast numbers. The diagnostic marks between those species are well defined and cannot be produced by variations in condition.

* The subject of the identity of the *gorbuscha*, and the hump-backed salmon of Puget Sound is spoken of more in detail, under the head of *Salmo proteus*.

Of the present species we have identified seven specimens now in the Smithsonian collection. Several of these are perfect skins, obtained by the writer from Puget Sound; others are simply the *heads* of individuals received from different sources. The figure given by Richardson in the latter part of his work on *fishes*, in the *Fauna Boreali Americana*, is an excellent representation of the adult male of this species.

SALMO PROTEUS, Pallas.

Hump-backed Salmon

Specimen in Smithsonian collection, Fishes, No. 1132.

SYN.—*Salmo proteus*, PALLAS, Zoog. Ros. Asiat. III, 376.—VALENC. in *Ouv. & Valenc. Hist. Nat. Poissons*, XXI, 1848, 360.

Salmo gibber, SUCKLEY, Ann. N. Y. Lyceum Nat. Hist. Dec. 1858.

Gorbuscha of KAMTSCHATKA; *Hunnun* of the LUMMIES; *Huddoh* of the NISQUALLIES.

SP. CH.—*Male*: Dorsal profile much more arched than in *S. Scouleri*, RICH. After entering fresh water, an adipose hump becomes strikingly apparent, its greatest prominence being nearly opposite a point midway on a line drawn from the eye to the anterior margin of the base of the dorsal fin; intermaxillary projection curved strongly downwards as in *S. Scouleri*; jaws long, as in latter, the lower terminated by a dilated knob, (as in several other species of the genus,) which is armed with four or five strong, sharp teeth on each side; labials and limbs of the lower jaw closely set with very fine, sharp teeth, finer and more numerous than those of the *S. Scouleri*; vomerine and palatine teeth much larger than those of the labials; those on the vomer disposed in a single row on its anterior portion; tail rather strongly lunated, and profusely dotted with elongated oval dark spots; the other fins usually unspotted, adipose rather elongated; scales much smaller than those of the *S. Scouleri*, those of the back are much smaller than those below the lateral line.

Hab.—The Northern Pacific coasts of Asiatic Russia and America; Puget Sound.

The colors of this, like those of other species, vary much after the fish enters fresh water. Those caught in salt water are more or less silvery. After entering fresh rivers the color of the upper parts become of a dirty grayish yellow; below white, blotched with yellow. These colors, however, vary considerably in different individuals.

Dr. Kennerly, who obtained a specimen of the present species at Anaimo, Vancouver's Island, September 22, 1857, remarks in his notes that it was a male, having the "head greenish yellow, clouded with black; opercula dull pinkish. Upper parts dirty grayish and yellow; under parts white, blotched with yellow; ventral and pectoral fins grass green; dorsal, ultramarine blue and green. Tail blotched (spotted?) with black."

The teeth on the limbs of the lower jaw of this specimen extend backwards only half their length. Tongue apparently destitute of teeth. Branchial rays, 11. 11. Total length, 25½ inches. Length of head, 7 inches. Depth of hump, 7 inches.

The Indians say that this salmon is usually quite fat, and that as food they like it very much. They state that it enters Puget Sound and the rivers on alternate years, it being very rare for even a single individual to be caught in the intermediate season. The "run" of the *huddoh* in its regular years is large, coming in vast numbers, comparing favorably, in this respect, with the *satsup*, *skowitz*, or *Tl-hwhai*. According to the natives of our coast, the hunch-back *never* returns to the sea after spawning, but die in fresh water. In this respect they again agree with the Kamtschatka fish.—(See beyond.)

Mr. George Gibbs says: "*Hunnoh* come only every second year. The Indians say that when they do come there are always great abundance of salmon berries and other berries, and the summers are very warm. In the summer of 1853, when Captain McClellan's party were in the Yakima country, berries were very abundant and salmon scarce, while the reverse was the case in 1854. The *hunnoh* arrive early in August, and last a month. The female is like the others. The males have a large hump on the back, and an immense head; flesh of the males white, females red. Upper jaw shuts over the under. The males have large hooked

teeth; color of back greenish, beneath dirty white. This fish is poor eating. There is no apparent difference between the female of this and the *stoaquid*. The average weight is only 5 or 6 pounds."

Concerning the Kamtschatka salmon, Sir John Richardson, in a foot-note, gives the following quotation from Pennant's *Arct. Zool.*, Intr., p. cxxv: "The *gorbuscha*, or hunch-back, ascends the rivers in July. In form it resembles the grayling; *never exceeds a foot and a half in length*; is of a silvery color and unspotted; the tail forked; the flesh white. After it has been some time in fresh water it changes its shape (the male especially) in a most surprising manner. The jaws and teeth grow prodigiously long, especially the upper, which is at first shortest, but soon shoots beyond the under, and grows crooked downwards; the body becomes emaciated, and the meat bad; but what is most characteristic, an enormous bunch rises just before the first dorsal fin, to which it owes its name. Its flesh is bad, so that this fish falls to the share of the dogs. Rays: D. 14-0; P. 15: V, 11, A, 18."

Pallas, in describing the *gorbuscha*, (*S. proteus*,) says that the body is unspotted and silvery; the "beak" conical; anal fin with 14 rays; caudal forked, spotted. It enters some of the Kamtschatkan rivers, avoiding others, leaving the sea about the middle of July. It ascends the rivers in such shoals that when the weather is calm the water is so agitated by the fish as to appear disturbed by waves, and they can then be readily taken with the hand. Their form becomes monstrous, the hump appearing, and the jaws become so curved that the mouth, which had been hitherto symmetrical, cannot be closed or receive food. After the month of August has been passed in generation, *all of these fishes perish in the rivers* and strew the banks with their dead bodies, none returning alive to the sea. He adds that they appear to be on the opposite shores of America, quoting Vancouver, who says that he there found a salmon with a hooked beak in *both sexes*, and a hump back in the male. He then gives a description of a particular individual of the species, having a length of 2 feet, and weight of 4 or 5 pounds. The teeth, which in the sea were soft and rudimentary, grow out, and the colors change greatly before death, becoming first blue, then livid, afterwards chestnut, and, from the loss of blood, the sides become stained with various morbid colors, as if it had been bruised. The fish in the sea is very active, but after entering fresh water becomes lean, inactive, and unsavory. The females are smaller and not numerous, being, when compared to the males, as one to twenty. The muzzles of the fresh run males are attenuated in a cylindrical form; the jaws equal, but finally much hooked. Upper jaws with a somewhat interrupted row of teeth on each side, of which all the anterior are strong and hooked; those posteriorly on the narrow maxillary plates awl-shaped, straight, and very small. Teeth on the lower jaw are not continuous behind the middle of its limbs; they are somewhat unequal, and are smaller than the teeth of the apex, which are large and hooked. Palate with *a row of a few teeth along the middle*, and another on each side, *Br. rays* 11 or 12. Body above covered with very small scales, those below the lateral line being larger. Adipose dorsal fin elongated.

In the foregoing particulars the description applies admirably to the characters possessed by the two specimens in the Smithsonian collection, sent by Dr. Kennerly. The description of the jaws and the dental arrangement exactly applies, with the exception that in one of the Puget Sound specimens the vomerine teeth are wanting.

Pallas adds that the lateral line is very straight, and placed rather near the back. It is apparently formed by the fusion of small scales; but upon close examination this appearance is found to result from the presence of hair-like sculpture on the scales. Dorsal fin anterior to

the ventrals; rays 12, the two anterior simple. Adipose nearly opposite to the posterior rays of the anal. Pectorals with 15 rays; ventrals with 10. Anal stout, with 14 or 15 rays. Caudal marked with dark oval spots, more distinct in the smaller fish.

From the preceding account I have but little doubt that the species found with us is the same as that of Pallas, and have accordingly adopted his synonym. It is not unlikely that more of our species may prove identical with those of Kamtschatka. This theory is not opposed by the physical conformation of the two continents, which, approaching each other so closely at the north, are also nearly joined at a comparatively southern point by the chain of islands formerly the Aleutian archipelago.

The present species may be distinguished from the *S. Scouleri* by its smaller size, the prominent hump in the males, its smaller scales, and the fine regular teeth along the sides of the jaws. The teeth of the *S. Scouleri* are scattered irregularly, and are generally large; but by no means uniform in size along the sides of the maxillaries.—T.

SALMO CANIS, Suckley.

Dog Salmon; Spotted Salmon.

SYN —*Salmo canis*, SUCKLEY, ANN. N. Y. Lyc. Dec. 1858.—*Lekai*, CHINOOK JARGON; *Tlh-whai*, NISQUALLIES.

SP. CH.—*Male*: Gape line of mouth much arched; intermaxillary protuberance well marked, decurved; fleshy prolongation beyond chin rather thick; jaws fully provided with large strong teeth, so large as to give rise to the name of dog salmon; dorsal outline moderately arched; body compressed laterally, but rather deep; weight of full grown adult rarely exceeds 12 or 14 pounds. Colors, upon first arrival into fresh water, of a dingy greenish olive on the back, fading into brassy yellow on the sides, and to dingy yellowish white on the belly; sides more or less maculated with large alternate patches of dingy green and purplish red; flesh pale, and of inferior quality; upper fins and tail dark.

Hab.—Northwest coast of America. Enters the streams along Puget Sound in great numbers in autumn.

The spotted or lekai salmon enters the rivers of Puget Sound in great numbers every autumn, generally appearing between September 15 and October 10. They come in vast numbers, and arrive so simultaneously as to seem to be in shoals, though, probably, that is occasioned not by a gregarious character, but by the same instinct causing all the individuals to leave the sea at about the same period for the purpose of procreation.

They are not a finely flavored fish, even when "fresh run," many individuals being at that time in bad condition—a condition unusual among salmon just quitting salt water. After a short residence in fresh water all become poor and unsavory, and some even intolerably rank. Upon first arrival the sickly fish are readily distinguished by the natives by their colors, the best fish being of a leaden olive or dingy green on the back, and a yellowish white along the belly; the poor ones are of various shades and tints of dingy green and yellow, more or less maculated on the sides with purplish and black blotches. They enter, by preference, the smaller streams.

Owing to the large jaws and long ferocious-looking teeth of the species they have obtained from the whites the name of dog-salmon. Vast numbers are taken by the Indians with spears, gaff hooks, weirs, &c., and dried for winter use. Upon their arrival in September and October their roes are nearly mature.

It is interesting to witness their persevering efforts to run up shallows, and in overcoming insurmountable obstacles, even running out of water upon the shores, in their blind eagerness to surmount impossibilities and reach the headwaters of the stream to deposit their spawn. In endeavoring to ascend high falls, and in passing through rocky, violent passages, their snouts

and bodies become much bruised and injured, giving rise to sores and ulcerations. The fins become much worn also. The impoverished fish have hooked snouts and pale whitish flesh. At no time is it seen with the bright salmon-red flesh common to other kinds; but on the first arrival, when in good order, they are found with flesh which, when cooked, has a pinkish buff color, and is not, in my estimation, bad.

Like several other species of salmon they are very regular in the periodical arrivals at the mouths of the rivers. In 1856 they arrived in the vicinity of Fort Steilacoom on the 3d of October, and by the 7th were in such vast numbers that a small boy, with a pole armed with a gaff hook, could readily take one or two hundred pounds weight in an hour.

The Nisqually Indians say that these salmon, although entering fresh water later than the *skowitz*, (*S. Scouleri*), return earlier, their stay being shorter. They state also that the greater number go back to the sea, after spawning, more than those of any other species of large salmon; the *hunch-back* all dying, and but few of the *skowitz* surviving.

Mr. Gibbs says of this species: "The common dog-salmon is preferred by the Indians for drying, because there is but little fat upon it. It has a hooked nose, and very large hooked teeth, both increasing with age. When "fresh-run" the meat of the female is red, but soon becomes white. The Indians do not dry them until they have been in fresh water some time, and have lost what little fat they had. They arrive about October 1, and last until late in the winter. The Indians split them very thin, take out the back bone, and dry all parts."

3. SALMO SPECTABILIS, Grd.

Red-Spotted Salmon Trout.

SPEC. CHAR.—Body sub-fusiform in profile, very much compressed, the head forming about the fourth of the total length. Maxillary bone curved, extending to a vertical line passing somewhat posteriorly to the entire orbit. Anterior margin of dorsal fin a little nearer the extremity of the snout than the base of the caudal. Brownish gray above; silvery beneath. Dorsal region and upper portion of the flanks spread over with light spots; those on the sides bright red, as in *S. fontinalis*.

SYN.—*Salmo spectabilis*, GRD. in Proc. Acad. Nat. Sc. Phila. VIII, 1856, 218.—IBID. Pacific R. R. Reports, *Fishes*, p. 307.

Red-spotted salmon trout, OREGON SETTLERS; *pussutch*, NISQUALLY; *commahmah*, CLALLAM.

Dr. Girard says: "The only specimen which we have before us being in a rather precarious state of keeping, our description of the species must, of course, remain incomplete. All the fins being broken off from their very bases, the length and shape of the caudal could not be ascertained. The abdomen itself is ruptured, and all the viscera are lost."

As Dr. Girard suggests, the colors of this fish were very much altered by the preservative. The specimen upon which the specific characters of the species were based is, as yet, alone in the Smithsonian collection. It was obtained by me, in the year 1854, at Fort Dalles, Oregon, (*not* from the St. Mary's Mission, as stated in the general report,) where the species is not uncommon.* It is said by the inhabitants to be more partial to particular streams, and to be quite plentiful in a small rivulet called Dog river, which, arising on the north side of Mount Hood, empties into the Columbia about ten miles below Fort Dalles. It comes late in the summer, and for this reason I suppose it to be *anadromous*. This is certainly the case if it is identical with the red-spotted salmon trout so abundant in the bays and rivers of Puget Sound in autumn, which is known to the Nisqually Indians as the *pussutch*, and is taken in moderate numbers throughout the summer, and in immense quantities in autumn. The colors of the species are, as near as I can remember, as follows: Back and upper parts pale brownish olive;

* Many fine specimens of the *pussutch* were obtained by me at Fort Steilacoom, and forwarded to Washington, but never reached their destination.

sides more or less silvery; belly white, or yellowish white; back, top of head, and upper fins spotted with large spots of a cream color. Spots on the sides *bright red*, as in the *S. fontinalis*.

As early as the first of June this beautiful fish is found running up the Nisqually, Dwamish, and other rivers emptying into Puget Sound. They are taken sparingly from those waters until October, when they enter the mouths of the rivers in vast numbers, and are taken by hook and line, nets, traps, &c., until *near Christmas*. The largest individual of this species that I saw was about two feet in length, and was taken in the Dwamish river, in June, 1856. The individuals caught late in the autumn average about 14 or 15 inches in length, and seem generally more slender than the summer fish, although they are in equal flavor and condition for the table. In my opinion they exceed both the salmon and brook trout in delicious table qualities, as they also certainly exceed both in *beauty*. The flesh, when cooked, is of a delicate salmon hue, that of the autumn fish being a little paler. They are in general more slender in proportion to their length than either the true trout or salmon. I obtained a very handsome specimen of the *pussutch* which was caught in Green river, Washington Territory, 35 miles from salt water, about the middle of June, 1856. Upon it were two rows of rose-colored spots *below the lateral line*. They were generally about two and a half lines in diameter. Above the line there were, to the dorsal median, several nearly parallel rows of the same sized spots of a yellowish white color. The jaws of this fish were well provided with strong, sharp teeth. The little Indian boys catch great numbers of this species with hook and line. They use salmon roe principally for bait. I think that early in the season an artificial fly would answer well, and very much regret that the hopelessly fractured condition of my only fly-rod prevented my testing the question. I have heard it said that "salmon trout," answering to the description of this fish, are found in the waters of California. Upon conversing with Dr. W. O. Ayres, well known as an ichthyologist, and for some years a resident of San Francisco, he informed me that he had not seen the species in that State. Perhaps the fish is only caught in the fresh water streams some distance from San Francisco; or perhaps the species is really not found in California at all. The accounts of non-scientific describers are very unreliable, and on the Pacific coast, especially, there is great confusion among fishermen as to vulgar synonyms, brook trout, salmon trout, and salmon, being terms indiscriminately used. Besides these sources of confusion, there are in the northwest waters, perhaps, two well marked species of red-spotted salmon trout, which are entirely different from the species under consideration. One of these was observed by Mr. George Gibbs, esq., (geologist to the western division of the north Pacific railroad survey and exploration,) in the Yakima valley. It was about two feet in length, and may have been merely a large individual of the present species.

In Lake Pend d'Oreille, a sheet of water formed in the second chain of the Rocky mountains by a dilatation of the Clark river, of much the same size, shape, and general character, as Lake Geneva, in Switzerland, (from the lower end of which the Rhone escapes in a similar manner,) I have seen a very handsome species of red-spotted lake trout. The spots along the flanks are of the size of large peas, and are of a beautiful rose color. The length of the adult fish will average 20 inches. Its form is slender, and the dorsal profile but slightly arched.

SALMO AURORA, Grd.

PLATE LXVIII.

"SP. CH.—Body fusiform, compressed; head forming the fourth of the total length, caudal fin excluded. Upper jaw longest. Maxillary gently undulating; its posterior extremity extending to a vertical line passing considerably behind the

entire orbit. Anterior margin of dorsal fin equidistant between the tip of the snout and the base of the caudal. Ground color grayish silvery above; sides and belly yellowish orange; dorsal fin spotted."—GIRARD.

SYN.—*Fario aurora*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 218.—IBID. Gen. Rep. *Fishes*, 1858, 308.

Salmo aurora, GRD. MS.

?? *Red-char*, LEWIS & CLARK.

Two specimens of salmon, upon which Dr. Girard based the description of the present species, were obtained, in 1854, by Lieutenant Trowbridge, United States army, at Astoria, near the mouth of the Columbia. From the appearance of these fish I am inclined to the belief that they are immature, being the young of a species as yet unknown in the adult state. A full description of the specimens is contained in the general report on the fishes, P. R. R. Reports, volume X.

Dr. Girard has placed the present species under the genus *Fario*, (Valenc.,) the characters of which are appended in a foot-note.*

SALMO CLARKII, Rich.

Clark's Salmon.

SYN.—*Salmo Clarkii*, RICH. F. B. A. III, 1836, 224.—STORER, Synop. 1846, 197.—HERBERT, Fish and Fishing of the U. S. Suppl. 1850, 40. (Non *Salmo Clarkii*, GRD.)

SP. CH.—(Drawn from Richardson's description and Dr. Gairdner's notes.) Dorsal profile nearly straight. Ventrals opposite to the middle of first dorsal. Fissure of mouth oblique. Extremity of caudal nearly even. Both jaws armed with strong hooked teeth, a single row on each palate bone, and a double row on the anterior half of the vomer and on the tongue. The teeth are long, slender, and acute. Lingual teeth longest and most curved. An oblong plate on the isthmus which unites the lower ends of the bronchial arches, rough, with very minute teeth. Sixty-six vertebrae in the spinal column.

The colors of the species, as given by Dr. Gairdner, are not retained in the foregoing list of specific characters, as from the marked existence of large red and purplish patches we infer that the specimens described were not in prime condition. Dr. Gairdner says: "Back generally brownish purple-red, passing on the sides into ash gray, and into reddish white on the belly. Large patches of dark purplish red on the back. Dorsals and base of the caudal ash gray; end of caudal pansy purple. Back, dorsal, and caudal studded with small semi-lunar spots. A large patch of arterial red on the opercle and margin of the preopercle. Pectorals, ventrals, and anal grayish white, tinged with rose red." The rays are given in the following formula: "Br. 11; P. 12; V. 8; A. 13; D. 11—0."

The specimens described by Sir John Richardson were obtained by Dr. Gairdner from the Katpootl (Cathlapootl) river, a small tributary of the Columbia, emptying into the right side of the latter a short distance below Fort Vancouver. Richardson named the species in honor of Captain Clark, the indefatigable explorer, and seems to consider it identical with Captain Clark's dark variety of salmon trout, (which we think is the same as our *S. Gibbsii*.) In color, Richardson says, "this species resembles the *mykiss* of Kamtschatka, and there is no very material discrepancy in the number of rays in the fins."

The same writer, in the addenda to the *Fishes*, page 308, notices some trout received from

*Genus FARIO, Valenc.

"GEN. CHAR.—Possesses all the characters of the salmons, differing from the latter by the presence of only one row of teeth upon the shaft of the vomer. The rest of the bones forming the upper roof of the mouth being toothless."—GIRARD.

New Caledonia as follows: "The *ultai* of the New Caledonia tribes differs from the last* in the scales being firmer, duller, and rather smaller, and the body more thickly and generally covered with black spots, *which extend well down the sides*. The spots on the dorsal and tail are also more regular and conspicuous, and the teeth are stronger, especially those on the palate bones; a flexuose row on the vomer does not extend quite so far back as the palatine teeth. The *ultai* is most probably the *Salmo clarkii*, (p. 225,) and also the dark salmon-trout of Lewis and Clark, noticed in page 163."

The *mykiss* of Kamtschatka referred to by Richardson is the *S. purpuratus* of Pallas. From the abundance of red and purplish markings of this fish—marks by no means strongly displayed by Dr. Girard's *S. clarkii*, even when that fish is in bad condition—we certainly cannot consider the latter to be the *mykiss*, or that the *S. clarkii* of Girard is that of Richardson.

The *Salmo clarkii* of Richardson is probably one of the autumnal species of anadromous salmon which, not feeding in fresh water, become, when exhausted, marked with patches of red. No specimens have been obtained in any of the recent collections.

SALMO MASONI, Suckley.

Fario clarkii, GRD. pl. LXXI, figs. 5-8, Vol. X.

SP. CH.—Body sub-fusiform; head well developed, forming the fifth of the total length. Maxillary slightly bent, extending to a vertical line drawn inwardly to the posterior rim of the orbit. Jaws equal. Anterior margin of dorsal fin a little nearer the extremity of the snout than the insertion of the caudal fin. Back brownish grey; upper surface of head blackish grey; sides silvery grey; fins ash grey; dorsal and caudal spotted. Upper regions of head and body studded with irregular black spots or specks. Tail emarginate.

SYN.—*Fario clarkii*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 219.—IB. Gen. Rep. Fishes, p. 314. [Non *Salmo clarkii*, RICHARDSON.]

I obtained this species at the *Cath-la-pootl* river, August 2, 1853, and am indebted for it to the skill of Captain McClellan, as he took it with the artificial fly at a time when they did not readily bite at any bait. The Indians brought to our camp about the same time what I supposed to be the same species, some of them two feet long.

When fresh its colors were as follows: Back, dark olive; sides, silvery, with green and purple reflections; belly, white; iris, yellow; spots black.—C.

According to Dr. Girard, the arrangement of the rays is as follows: Br. 11; p. 14; V, ?; A, 13; D, 15. For reasons that seem to me sufficiently good, I have considered this fish distinct from that described as *F. clarkii* by Richardson, and have named it in honor of my good friend Governor Charles H. Mason, of Washington Territory, who has so frequently aided me in adding to my collections specimens of great interest and value in various branches of natural history.

Specimens of this trout were obtained by the writer at Fort Dalles, on the Columbia, from the same waters as the other brook trout was taken. It runs up the small streams a little later than the latter, and is distinguishable at a glance by its smaller and less numerous black spots, and by wanting the red patches under the jaws, already alluded to. In habits, size, &c., it is almost precisely similar to the other species, and is taken with the same baits, jumping readily at the artificial fly, and freely taking meat, grasshoppers, worms, and similar food.

There is a trout very common in the small streams emptying into Puget Sound, near Fort Steilacoom, during the latter summer months and early autumn, which resembles this species

* Alluding to a fish known to the tribes of New Caledonia as the "*suppai*."

very closely, and probably is identical with it. They are caught freely with either common bait, or the "artificial fly," but by preference choose more readily half-dried *salmon-roë*, which fishermen, who are not too sportman-like to indulge in such unartistic angling, very frequently use, preferring the roë in its half-dried, glutinous, sticky, condition, because it adheres more readily to the hook. With such bait, and with "artificial flies," the writer has taken in a few hours large "strings" of handsome trout; on one occasion catching thirty-four fish, the aggregate weight of which, when some hours out of the water, amounted to fifteen pounds. A favorite place for catching these fish is McAllister's creek, a small stream about eight miles from Olympia, the capital of Washington Territory. The best "spots" for fishing there, are below the "old mill site," at a point where the stream meanders through the Nisqually "tide prairies," and where the tide ebbs and flows strongly. The best angling is had during the last of the *ebb*, and half through the *flood*, at which time the trout, having retreated to the deep holes, can be caught very rapidly. At the same place I have caught with a hook and line several young "silver salmon," such as might be called by the English *grilse*.

FARIO STELLATUS, Grd.

Oregon Brook-Trout.

PLATE LXIX, FIGS. 5—8.

SP. CH.—Body elongated and fusiform; head well developed, contained four times and three-quarters in the total length; jaws equal; maxillary gently curved, reaching a vertical line, drawn posteriorly to the orbit. Anterior margin of dorsal fin a little nearer to the extremity of the mouth than the insertion of caudal fin. Back light olive; belly light yellowish white. Head, body, and fins profusely spotted with black.

SYN.—*Fario stellatus*, GRD in Proc Acad. Nat. Sc. Philad VIII, 1856, 219. —IBID, Gen. Rep. Fishes, p. 316.

Opkalloo, WASCO INDIANS — *Common trout*, vernacular.

This trout is found in all the rivers about Shoalwater bay, and above tide-water take the hook readily in spring and fall. I consider it entirely a fresh water fish, though called there "salmon trout." It grows to the length of two feet, and is said sometimes to weigh fifteen pounds. In color it closely resembles the preceding.—C.

The trout of Oregon and Washington Territories, which replace the *Salmo fontinalis*, or common trout of the middle and Atlantic States, belong to two species, very similar to each other in their habits, which are also much like those of their Atlantic congener just mentioned. They belong to the species last described and to the present kind.

The *S. stellatus* is very abundant in all the brooks and small rivers emptying into the lower Columbia and Puget Sound. It seems to enter the more rapid streams early in the spring, but, I doubt whether it can be strictly called *anadromous*, as it is found in sluggish fresh water at all seasons; and I have caught it frequently from small lakes and brooks having no connexion with the sea at any season. When living in brooks near the sea they seem to avail themselves, however, of the invigorating effects of salt water, as I have caught them sparingly in such situations; but, as already stated, access to the sea seems to be by no means absolutely necessary even to health. The spawning season appears to be at its height in mid-winter, and lasts, occasionally, in certain individuals, as late as the first of March.

While stationed at Fort Steilacoom I frequently amused myself by angling for trout, either using the "artificial fly" or common bait. Angle-worms being not found, as yet, in that region, I was obliged to rely upon *meat*, *fresh fish*, and *salmon-roë* when desirous of using natural bait. Unlike the *S. fontinalis*, (the common brook-trout of New York,) this trout does not delight in

the rough, foaming, swift waters of rapids and cascades, but seemingly prefers streams having a *gentle* current, and is even not averse to the still waters of *quiet lagoons*, providing that they be cold, deep, and clear. Like the Atlantic species they are fond, in summer-time, of lying in shady situations during the heat of the day. They are found in many of the small lakes, on the Nisqually plains, near Fort Steilacoom, from which they can be taken in great numbers with the "fly," affording much sport to the scientific angler. The largest caught by me, in that vicinity, were taken in February from the tidal waters of a small mill-stream. They weighed a little more than two pounds each, and were the largest of the species that I have ever seen. I doubt very much whether they are taken over three pounds in weight, from half to three-quarters of a pound being more common. The fish just mentioned, as taken by me, were caught with a large, gaudy, *unnatural* salmon-fly. In the same stream, but from the brackish water near its mouth, I caught, in January, 1854, many trout. Some were taken with the "revolving spoon," and others with the "fly," or with meat. At that season they were generally soft and "flabby," and seemed to be in an anaemic condition consequent upon spawning. Other specimens, even at a considerably later period, had not yet spawned, and, when caught, seemed literally overflowing with milt and mature ova, which were plentifully discharged on the slightest pressure, or even when jarred while being carried strung, in the ordinary manner, on a stick. A fish, in bad condition, taken at that time, had the following colors: Back bright olive; belly light yellowish white; numerous black spots on head, sides, and fins. Patches, under the chin, of very pale yellowish vermillion, *not bright red*, as in the same fish when in good order. Other fish taken while in the same condition showed much more of the unhealthy red blotches, &c., so frequently alluded to in this report. In common with the other trout this is called the *kwuss-putl* by the Nisquallies. It is a fine active trout, affording much sport to the angler, and is a hardy fish, capable of adapting itself to very varied circumstances. For the table its flesh, however, is by no means equal to that of its Atlantic representative. With the exception of its lacking *red* spots along the sides it is as handsome as the latter fish. Like the eastern trout they are capricious in their appetites, and at times will reject food which on other occasions they seize with avidity. The ova, when *mature*, are of a pale yellowish red, and are nearly double the size of those of the brook-trout of the middle States. The skin of a male fish of this species was preserved by me at Fort Dalles, Oregon. It was caught on the 18th of April, 1855, and seemed in good condition, although its flesh was quite pale. The spots on the body were black, each being paler in the centre. They were irregular and numerous, and were numerous on the upper and caudal fins, head, and opercula. Color of back bright silvery olive, lighter on the sides, and silvery white on the belly. Pectoral, ventral, and anal fins reddish orange. The patches of vermillion, on the anterior concealed borders of the branchia, were bright, and, like those of the trout caught in Clark's Fork, and some of those found in the affluents of Puget Sound, form a striking mark quickly recognized by the most superficial observer. The colors, as just given, may be considered as normal to the healthy adults of moderate size, and would admit of insertion under the head of *specific characters*.

At Fort Dalles this species is common in all the permanent streams in spring, and is taken in company with the other species of black-speckled trout during the summer months. The other kind, *S. masoni*, has smaller spots, which are more scattered and less numerous; and, so far as my observation extends, it lacks the red streaks under the jaw. The two species also vary in the comparative size of the scales, those of the *S. masoni* being larger than the present.

SALAR, Valenc.

GEN. CH.—All the characters of the salmons, but differing from them as well as from the genus *Fario* in being provided with a double row of teeth upon the shaft of the vomer, whilst the front of that bone is smooth and toothless.

SYN.—*Salar*, VALENC. in *Cuv. & Val. Hist. Nat. des Pois.* XXI, 1848, 314.—GRD. in *Proc. Acad. Nat. Sc., Philad.* VIII, 1856, 219.

(SALMO,) SALAR LEWISI, Grd.

Missouri Trout.

PLATE LXXII.

SP. CH.—Body rather thickish upon the middle region; head moderate, constituting a little less than the fifth of the total length; maxillary gently curved; its posterior extremity reaching a vertical line drawn immediately behind the orbit. Anterior margin of dorsal fin a little nearer the extremity of the snout than the base of the caudal fin. Ground color of the upper region bluish gray, of the inferior region orange or yellow. The back, peduncle of the tail, dorsal, adipose and caudal fins are spotted with black. The belly and lower fins are unicolor, a deep orange hue existing along the rays, and also in the shape of a dot upon the abdominal scales, and which disappear in alcohol.

SYN.—*Salar lewisi*, GRD. in *Proc. Acad. Nat. Sc. Philad.* VIII, 1856, 210.—IB. *Gen. Rep. Fishes.*

The present species was first noticed by Lewis and Clark, who took them at the falls of the Missouri river, and expressly noticed the absence of red spots upon them, which are replaced by black.

I made a journey of thirty miles expressly to obtain specimens of these trout, and succeeded in taking with the "fly" some half dozen, two of which were preserved, and were the typical individuals upon which Dr. Girard described the species. They were taken at a point just below the falls above mentioned, and are doubtless the same as those got by Lewis and Clark. The individuals procured by me averaged about one pound in weight. Some doubtless attain a much greater size, perhaps reaching four or five pounds. Many trout were found in the Rocky mountains, most numerous, however, west of the dividing ridge, in the small tributaries of Clark's Fork. In general appearance they seemed identical with this species, but no critical examination was made, the specimens procured having been destroyed *in transitu*. If they are found to be identical in species, the *S. lewisii* will then be included in the fauna of Washington Territory.

THALEICHTHYS PACIFICUS, Grd.

The Eulachon.

PLATE LXXV, FIGS. 1-4.

SP. CH.—Head sub-conical and pointed. Mouth large; posterior extremity of maxillar bone extending to a vertical line drawn posteriorly to the orbit. Eye rather small. Adipose fin placed opposite the posterior portion of the anal, which is quite elongated. The insertion of the ventral fins is situated considerably in advance of the anterior margin of the dorsal. Scales moderate, sub-elliptical. Dorsal region, dark grayish olive; middle of flank, yellowish orange dotted with black; belly yellowish, unicolor; upper surface and sides of head grayish; fins, unicolor.

SYN.—*Thaleichthys stevensi*, GRD. *Gen. Rep. Fishes.*

Salmo (mallotus) pacificus, RICH, F. B. A.

To Sir John Richardson's account of the *Eulachon* but little can be added. They formerly entered the Columbia river in great numbers, and were equally abundant in Puget Sound. At present, although sparingly found in the waters named, they cannot be considered as occurring in large numbers south or east of the southern end of Vancouver's Island. In the latter locality they are very abundant in certain seasons, but nearly always a season of abundance is followed by three or four years of scarcity. Further northward they are constantly abundant. The Haida, Stickene, and Chumtseyan Indians, living along the coasts of British and Russian

America, bring vast quantities of these fish with them when visiting the white settlements on Puget Sound. The fish thus brought are for the consumption of the strangers during their stay, and have been simply dried, without salt, and for convenience in drying or transportation have been strung on sharp, pliable sticks which are passed through the heads.

In July, 1856, Dr. William Fraser Tolmie, chief factor of the Hon. Hudson Bay Company, a gentleman well known to naturalists for his interest in science, presented me with a bunch of dried *eulachon*, which he had obtained from some of the "Northern" Indians. Dr. Tolmie also gave me the following memoranda: "These fish were caught at the mouth of Nass river, which empties into salt water near latitude $54^{\circ} 40'$ north. The Indian name of the species is almost unspellable. Formerly they were quite abundant between the 46th and 49th parallels of north latitude. They are now but seldom caught south of latitude 50° north in any great number. North of that point they are still taken by the savages in vast quantities, and are smoked and dried for trade and home consumption. When eaten after being thus prepared they should be either steamed or broiled." When thus cooked they are very palatable, and some that I have eaten, which had been salted like "Dutch herring" or "Yarmouth bloaters," as food are equal to any salt fish that exists. These fish are so fat that when dried the Indians frequently use them as substitutes for candles, as they burn when set on end with a clear, brilliant flame.

Several *eulachon* in the recent state were obtained by me from different portions of the lower end of Puget Sound and the straits. I am particularly indebted to Lieutenant Murden, of the United States revenue service, for a pair of excellent specimens of these, as well as for many other objects of natural history which he was often kind enough to collect for me.

Eulachon, like trout and salmon, are frequently so fat that *strong alcohol destroys them*. Any person who will discover a preservative fluid which will keep fish of this family in good anatomical condition, and to a *certain extent* (for that is all we can hope for) without effacing the natural colors of the fish, will confer a great favor to ichthyologists. I have tried various solutions but think my experience is in favor of strong alcohol diluted with one-third its bulk of fresh water, with a little common powdered alum added. The alum is thrown in for the same purpose that housewives frequently put it in their pickle jars, for the sake of what they call "fastening the colors" of the articles to be preserved.* Using a solution as above upon a handsome salmon trout, I had the opportunity of examining the fish one month afterwards when it was in a very good state of preservation, the red spots being almost of natural hue. I then sent the fish on its perilous voyage to Washington city. This voyage, which has so frequently blasted my endeavors ichthyological, was, as usual, *disastrous*, the specimen, with many others, never having been heard from.

* Care should be taken that too much alum is not added, as it is apt to attack the bones.

CHAPTER II.

REPORT UPON THE FISHES EXCLUSIVE OF THE SALMONIDAE.

AMBLOPLITES ÆNEUS, Agass.

Black Bass, &c.

PLATE I.

SP. CH.—Posterior extremity of maxillary extending to a vertical line intersecting the pupil. Insertion of ventrals opposite the base of the pectorals. Anterior spiny ray of anal fin under the ninth dorsal one. Posterior margin of caudal fin slightly emarginated. Upper regions of head and body of a coppery brown; inferior regions, yellowish brown.

SYN.—*Cichla aenea*, LESU. Jour. Acad. Nat. Sc. II, 1822, 214, fig.—KIRTL. Rep. Zool. Ohio, 18, 168, 191.

Centrarchus aeneus, CUV. & VAL. Hist. Nat. Poiss. III, 1829, 84.—RICH. Faun. Bor. Amer. III, 1836, 18. Pl. lxxv.—

DEKAY, New Y. Fauna, 1842, 27, Pl. ii, fig. 4.—KIRTL. Bost. Jour. Nat. Hist. IV. 1842, 229. Pl. xi, fig. 1.—

STOKER, Synops. 1846, 37.

"*Ambloplites aeneus*, AGASS." GIRARD, Gen. Rep. Fishes, P. R. R. Reports, X, 1858, 8.

Black Bass; *Black Sunfish*, &c. VERNACULAR.

The black bass is quite abundant in the lakes of western Minnesota. I have obtained them from the small lakes near Fort Snelling and also from Lightning lake, where they are very common, and attain a comparatively large size; the adults averaging more than a foot in length.

They take bait greedily, and I have caught many with the "revolving spoon." The flesh of the fish is excellent when cooked, comparing favorably with that of the pickerel or the pike-perch, in whose company it is often found. The best period in the day to fish for the species are, as with many others, the hours of early morning, or a brief period before sunset. Our command found the addition of such fine fish to their fare very acceptable, especially as the region where they were found in greatest abundance was almost entirely destitute of game, the buffalo region had not yet been reached, and confinement to bacon and flour had already become a hardship.

POMOTIS LUNA, Grd.

Northern Sunfish, or Moon Sunfish.

SP. CH.—Body sub-orbicular in profile. Head moderate; snout sub-conical. Mouth small; posterior extremity of maxillary extending to a vertical line drawn in advance of the anterior rim of the orbit. Eye moderate. Sub-orbital and supra-scapular bones not crenated. Edge of preopercle very slightly crenated. Opercular flap small. Spinous portion of dorsal fin of moderate height, and lower than the soft; its origin being situated opposite the base of the pectorals, and consequently in advance of the origin of the ventrals. Caudal fin posteriorly emarginate. Tips of ventrals overlapping the vent but do not reach the anterior margin of the anal. Extremities of pectorals nearly even with the tips of ventrals. Greenish brown above, yellowish beneath; sides of head with blue and yellow lines. Fine unicolor, either yellowish or greenish olive. (Colors described in alcoholic specimens)

YN.—*Pomotis vulgaris*, RICHARDS, Faun. Bor. Amer. III, 1836, 24; pl. lxxvi.—AGASS. Lake Super. 1850, 293.

Pomotis luna, GRD. in Proc. Acad. Nat. Sc. Philad. November, 1857.—IBID. Gen. Rep. Fishes, 22.

Northern Sunfish. Vernacular.

Sunfish, "pumpkin seeds," or roach, as they are called in Connecticut, are abundant in the same situations as the last mentioned fish. They are a little larger than the average of the individuals found in New York State, but in other respects seem very similar. They are taken with the same bait, and seem to be identical in habits with their more eastern relatives. I observed, in some of the lakes of western Minnesota, vast numbers of their spawning beds or nests. These were usually of two or three feet in diameter, and depressed in the middle.

STIZOSTEDION BOREUS, Grd.

Okow, or Horn Fish; Pike-perch; Wall-eyed Pike.

PLATE XI, FIGS. 5—8.

SP. CH.—Body slender, elongated, and sub-fusiform. Snout conical; mouth deeply cleft; posterior extremity of maxillary bone extending to a vertical line drawn posteriorly to the orbit. Scales on cheek and opercle not deciduous, larger upon the opercle than upon the cheek. Insertion of ventral fins situated posteriorly to the base of pectorals, and somewhat anteriorly to the origin of first dorsal. Posterior margin of caudal crescent shaped. Anus situated opposite the origin of the second dorsal fin. Yellowish or olivaceous, spotted with black.

SYN.—*Lucioperca borea*, GRD. Proc. Acad. Nat. Sci. Philad. November, 1857.

Okow, CREES,

Horn Fish, FUR TRADERS,

} RICHARDS. Faun. Bor. Amer. III, 1836, 14.

The pike-perch is extremely abundant in some of the lakes near Sauk river, Minnesota, and I found them quite common in the pond holes and lagoons of Milk river, a tributary of the Upper Missouri.

It is caught readily with the "revolving spoon" and with common bait, and when hooked is an active game-like fish, affording much sport to the angler. For the table its flesh is very good, resembling somewhat that of the yellow perch, or as if intermediate between that and that of the pickerel—hence its vulgar name.

CHIROPSIS NEBULOSUS, Grd.

SP. CH.—Dorsal fins contiguous. Caudal posteriorly sub-concave. Lower portion of cheeks and opercular apparatus scaleless. Base of anal longer than soft dorsal. Upper region black; inferior region olivaceous.

SYN.—*Chiropsis nebulosus*, GRD. Gen. Rep. Fishes, 1858, 45.

The colors above given are from an alcoholic specimen.

This fish was obtained by me from the brackish waters just inside of the mouth of Steilacoom creek, and was caught with the "revolving spoon." It is probable that it, like many of the sculpins there caught, merely enter the river at high tide, retreating to the salt waters of the sound at the ebb. The extremities of the fin rays are free, giving the fins a fimbriated appearance. These rays were of a dingy yellow color; sides mottled with dusky brown and dirty yellow; ventral fins yellowish.

COTTOPSIS ASPER, Grd.

Prickly-skinned Sculpin.

SP. CH.—Origin of first dorsal opposite the insertion of the upper ray of pectorals. First ray of anal under the fourth of second dorsal. Tip of pectorals extending to a vertical line passing posterior to the vent. Skin generally prickly; lateral line slightly deflected upon the peduncle of the tail. Grayish white, studded with clove-brown spots; beneath speckled.

SYN.—*Cottus asper*.—RICH. Faun. Bor. Amer. III, 1836, 295 and 313, pl. xcv, fig. 1.

Trachidermis richardsoni, HECK. Ann. Wien Mus. II, 1837, 162.

Centridermichthys asper, RICH. Voy. of Sulph. Ichthyol. 1844, 74; and, Rep. Ichthyol. China and Japan (Rep. Brit. Assoc.)

Cottopsis asper, GRD. Proc. Bost. Soc. Nat. Hist. III, 1850, 303.—Nouv. Mém. Soc. Helv. Sc. Nat. XII, 1851, 185; and, Smith. Contrib. to Knowled. III, 1852, 62.—GIRARD, Gen. Rep. Fishes, 51.

These small sculpins are very abundant in the small fresh water streams emptying into Puget Sound. I have caught them from streams communicating with the sea, but still securely interrupted by high mill-dams. The average size of the species, as found near Fort Steilacoom, is about three inches in length, having colors quite dark. Those caught on the Columbia, 200 miles above its mouth, are nearly twice as large and show much yellow in their coloration. They are readily taken by hook and line, and are easily recognized by their rough prickly skins. I have not heard of their being eaten, but doubt not that, were they larger, they might be found equal in nutritious qualities to the sculpins of salt water.

OLIGOCOTTUS MACULOSUS, Grd.

SP. CH.—Head sub-conical. Mouth moderately cleft; posterior extremity of maxillary extending to a vertical line intersecting the pupil. A stoutish bicuspid process on the convexity of the preopercle. Two acute nasal spines. Dorsal fins contiguous. Origin of anal in advance of the anterior margin of second dorsal. Yellowish brown above, mottled or variegated with blackish; along the dorsal region a series of blotches of a deeper hue; lower half of sides vermiculated. Abdomen of a bright saffron hue in the male. Inferior surface of head with traces of black markings; throat and abdomen unicolor, as also the ventrals and anal. Dorsals, caudals, and pectorals transversely barred.

SYN.—*Oligocottus maculosus*, GRD. Proc. Acad. Nat. Sc. Philad. VIII, 1856, 133; and, Journ. Bost. Soc. Nat. Hist. VI, 1857, Plate xxiv, fig. 7.—IBID. Gen. Rep. Fishes, 1858, 56.

Specimens of this fish were obtained at Puget Sound. No notes were made of its habits, which are probably much like those of the other sculpins.

LEPTOCOTTUS ARMATUS, Grd.

Slender Sculpin.

PLATE XV, FIG. 2.

Leptocottus armatus, GRD. Proc. Acad. Nat. Sc. Philad. VII, 1854, 131, 145; VIII, 1856, 133.—IBID. Gen. Rep. Fishes, p. 60.

Acanthocottus inermis, AYRES, MS.

SP. CH.—Head much depressed; upper jaw longer than the lower; posterior extremity of maxillary extending somewhat beyond the vertical of the posterior rim of the orbit. A preopercular process provided with three spines directed upwards. Blackish brown above; whitish beneath; dorsals, caudal, and pectorals yellowish, barred with black; anterior dorsal with a black spot posteriorly. Ventrals and anal whitish.—(The colors given are those of fish altered by alcohol. See below.)

The colors of this species are much changed by alcohol. When fresh they are as follows: Back olive, (nearly black in dark rivers,) or nearly yellow, sometimes, when pale, mottled with grayish and black, with three darker bars across body. Sides silvery, with purplish and rosy tints; belly dull white; pectoral fins white at base, becoming yellow towards the tip and barred with black; tail pale grayish, with olive bars; iris bright bronze gold color. The largest specimens are commonly the palest.

This fish inhabits Shoalwater bay and its rivers in abundance, and bites readily at the hook with almost any bait and at all seasons, but is rarely taken for food where much better fish are so abundant.

The young fish, from two to four inches long, run in shoals over the mud flats at the edge of the advancing tide, supplying food for the large flocks of gulls, &c., which are to be seen on the shore. These little ones are so much darker in color as to seem at first distinct species.—C.

Quite abundant at Puget Sound, where they are not unfrequently eaten by the Indians. The heads are cut off and thrown away and the rest of the body generally roasted. The flesh

is white and firm when cooked, and of delicate flavor, although somewhat dry. They enter the mouths of small creeks at high water, retreating with the tide. As elsewhere, they are bold, greedy feeders, and give the angler much annoyance when fishing for other and better fish by constantly nibbling off his bait and frequently insisting upon being hooked. I have taken them with ordinary clam bait, and also with the revolving spoon. The Indians generally procure them by spearing. A fish of this species, obtained by me at Fort Steilacoom in January, 1854, presented the following appearance: Upper parts of head and back yellowish brown, tinged with green; belly and lower parts white; lateral line yellowish white; pectoral fins brownish olive, tipped with very pale yellow, and crossed with four bars of bright yellow; ventral and anal fins yellowish white; caudal olive, crossed with three partial yellowish bands. The colors of this individual are a fair sample of those generally found in the species.

ASPICOTTUS BISON, Grd.

Buffalo Sculpin.

PLATE XV, FIG. 1.

SP. CH.—The posterior extremity of the maxillary extends to a vertical line drawn midway between the posterior edge of the pupil and the posterior rim of the orbit. The scutellae constituting the lateral line are crowded, vertically elongated. Upper regions dark greenish brown, mottled or blotched with black. Beneath dull yellowish, with meandric dark lines under the head and throat. Ventrals uniform yellowish white; other fins mottled yellow and black.

SYN.—*Aspicottus bison*, GRD. Proc. Acad. Nat. Sc. Philad. VII, 1854, 130; & VIII, 1856, 133.—IB. Gen. Rep. Fishes, p. 66.

Clypeocottus robustus, AYRES, Proc. Cal. Acad. Nat. Sc. I, 1854, 11.

This toad-fish or sculpin is not uncommon in the waters of Puget Sound. In habits it resembles the preceding species, but seems to confine itself more to deep water. A specimen, caught in January, 1854, had twelve ovoid brownish lilac spots on the iris, which was itself dingy white.

ARTEDIUS NOTOSPILOTUS, Grd.

Ayres' Sculpin.

PLATE XXII b, FIGS. 5 & 6.

SP. CH.—Surface of head sub-tuberculous and scaly. Preopercle armed with a flat tricuspid spine. Anterior margin of first dorsal situated in advance of the beginning of the dorsal band of scales, which is broad, and extends from the thoracic arch to near the terminus of the base of the second dorsal. Olivaceous, with a series of saddle-like black patches. Abdomen dull yellow or white.

SYN.—*Artedius notospilotus*, GRD. Proc. Acad. Nat. Sc. Philad. VIII, 1856, 134; & in Bost. Jour. Nat. Hist. VI, 1857;

Pl. xxiv, figs. 5 and 6.—IB. Gen. Rep. Fishes, p. 71.

Calycilepidotus lateralis, AYRES, Proc. Cal. Acad. Nat. Sc. I, 1855, 77.

But a single specimen of this fish was obtained by me. It was taken by Lieutenant Murden, of the United States revenue service, from Puget Sound, near Port Townsend. No notes were made of its habits.

ZANIOLEPIS LATIPINNIS, Grd.

Rough Sculpin.

PLATE XVII, FIGS. 5 & 6.

SP. CH.—Three small spines upon the convexity of the preopercle. First dorsal much longer than the second, with its two anterior rays protracted beyond the others. Anal fin longer than the soft dorsal, and provided with three spinous rays.

Upper surface and sides of head prickly and rough like the surface of the body. Color, yellowish brown; fins spotted or barred with black.

SYN.—*Zaniolepis latipinnis*, GRD. in Proc. Acad. Nat. Sc. Philad. November, 1857, 202.—IB. Gen. Rep. Fishes, p. 13.

No notes were made on this species. A single specimen was obtained at Puget Sound.

NAUTICHTHYS OCULO-FASCIATUS, Grd.

Bar-eyed Sculpin.

SP. CH.—Posterior extremity of the maxillary extending to a vertical line drawn across the anterior rim of the pupil. First dorsal anteriorly filiform. Extremities of posterior rays of both the dorsal and anal projecting beyond the insertion of the caudal. Anal fin shorter than the second dorsal, and not as deep as the latter is high. Ground color of a uniform rusty red. A black band crosses the eye, through the pupil, and extends across the cheeks.

SYN.—*Blepsias oculo-fasciatus*, GRD. in Proc. Acad. Nat. Sc. Philad. November, 1857, 202.

Nautichthys oculo-fasciatus, GRD. Gen. Rep. Fishes, p. 75.

This small sculpin seems to have generally the same habits as the other cottoids. A single specimen was procured near Fort Steilacoom.

SEBASTES MELANOPS, Grd.

Rock "Cod."

SP. CH.—Upper surface of head generally spineless. Posterior extremity of maxillary reaching a vertical line drawn anteriorly to the posterior rim of the orbit. Origin of dorsal fin opposite to or slightly in advance of the base of pectorals. Upper regions of a claret brown, the sides of the same mottled with darker.

SYN.—*Sebastes melanops*, GRD. Proc. A. N. Sc. Phil. VIII, 1856, 135.—IB. Gen. Rep. Fishes, X, 1858, 81.

Sebastes variabilis, AYRES, (non CUVIER,) Proc. Cal. Acad. Nat. Sc. 1854, 7; & Proc. Bost. Soc. N. Hist. V, 1855, 9.

Tuht-leh-de-gwrest of the Nisquallies, (GIBBS' MSS.)

This fish, improperly called rock cod by the settlers at Puget Sound, is one of the best table fishes there found. It attains a size of about 20 inches, and is said to vary much in color. It is frequently caught with the hook, biting freely at any ordinary bait.

GASTEROSTEUS SERRATUS, Ayres.

Gasterosteus serratus, AYRES, Proc. Cal. Acad. Nat. Sc. I, 1855, 47.—IB. Gen. Rep. Fishes, p. 88.

SP. CH.—Body entirely plated; peduncle of tail keeled. Dorsal spines three, high and slender, conspicuously serrated upon their edges; anterior one inserted a little in advance of the base of the pectorals. Insertion of ventrals situated somewhat in advance of the second dorsal spine, their own spines being serrated upon both edges, more conspicuously above than below, and extending beyond the tips of the *ossa innominata*. Posterior margin of caudal fin concave.—*Gen. Rep. Fishes*, p. 88.

Above, dark grayish olive; below, white, sometimes purpish.

I caught these little fish in a fresh water pond close to the bay, and suppose that they had merely entered to spawn, having observed the same species in salt water. This was in July and August, and I did not see anything of them in fresh water at other seasons. Their habits of building a little nest of grass, roots, &c., like a bird, in which the spawn is deposited and carefully watched, makes these fish interesting subjects of observation.—C.

GASTEROSTEUS PUGETTI, Grd.

Puget Sound Stickleback.

SP. CH.—Body partly plated; peduncle of tail not keeled. Dorsal spines three, slender, not serrated upon their edges; anterior inserted immediately behind the base of pectorals. Insertion of ventrals in advance of the second dorsal spine, their

own spine being slender, serrated upon its edges, and extending beyond the tips of the *ossa innominata*. Posterior margin of caudal slightly emarginated.

SYN.—*Gasterosteus pugeti*, GRD. Proc. Acad. Nat. Sc. Philad. VIII, 1856, 135.—IB. Gen. Rep. Fishes, 92.

Vast numbers of *sticklebacks* are found in the shallow fresh water streams near Fort Steilacoom. During severe droughts, some of the small brooks in that vicinity becoming dried up, multitudes of these little fish are found dead on the surface of the mud so recently submerged. Individuals of the species rarely exceed an inch and a quarter in length.

AMBLODON GRUNNIENS, Rafin.

Buffalo Perch; Grunting Perch, &c.

PLATE XXIII.

SP. CH.—Profile of the head depressed on the nape. Snout thick, blunt, and short. Posterior extremity of maxillary extending to a vertical line intersecting the anterior rim of the pupil. Extremities of pectorals almost even with the tips of ventrals, or else projecting slightly beyond them. First anal spine diminutive; second one stout and well developed. Caudal fin posteriorly convex. Color bluish-gray, lighter beneath than above. Fins grayish-olive, and maculated.

SYN.—*Ambodon grunniens*, RAFIN. Ichthyol. Ohiens. 1820, 24.—GIRARD, Gen. Rep. Fishes, 96.

Sciaena oscula, LESU. in Journ. Acad. Nat. Sc. Philad. II, 1822, 252; plate xiii.—KIRTL. Rep. Zool. Ohio. 168, 192.

Sciaena grisea, LESU. in Journ. Acad. Nat. Sc. Philad. II, 1822, 254.

Corvina oscula, CUV. & VAL. Hist. Nat. des Poiss. V, 1830, 98.—RICHARDS. Faun. Bor. Amer. III, 1836, 68.—

DEKAY, New Y. Faun. IV, 1842, 73; plate xxi, fig. 63.—STORER, Synops. 1846, 67.

Corvina grisea, DEKAY, New Y. Faun. IV, 1842, 76.

White perch of the Ohio, lake sheepshead, buffalo perch, grunting perch, &c., VERNACULAR.

A single individual was obtained from Milk river, Nebraska. No notes were made of its habits.

GUNNELLUS ORNATUS, Grd.

Banded Mud-fish.

PLATE XXVb, FIGS. 6 and 7.

Gunnellus ornatus, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 149.—IBID. Gen. Rep. Fishes, p. 116.

SP. CH.—Dorsal and anal fins contiguous to the caudal. Anal spines, two. Ventrals reduced to two exceedingly small spines. Head quite small. An occipito-ocular dark vitta continued vertically beneath the orbit to the hyoid apparatus. Ground color yellowish; about thirteen dorsal roundish spots of blackish brown, and about eighteen lateral, subquadrate ones of light brown.

This little fish may be generally found at low tide on oyster-beds and shoals, and seem to be almost amphibious. When alive they are of a dark grayish color, with tranverse bars and mottlings of a dark olive. They are resident in the bays at all seasons, and those collected are among the largest I have seen, their length not exceeding three inches.—C.

Several were obtained from the bays of Puget Sound, near Fort Steilacoom.

CEBIDICHTHYS VIOLACEUS, Grd.

Violet Monkey-fish.

PLATE XXVb, FIGS. 4 and 5.

SP. CH.—Upper surface of head narrow, declivous laterally. A fleshy crest along the cranial ridge. Mouth large; posterior extremity of maxillaries extending to a line drawn across the posterior rim of the orbit. Origin of anal fin situated

opposite the anterior margin of the soft dorsal. Ground color uniform brownish violet. An occipito-ocular vitta of deep purplish violet. Two other vittae of the same hue extend, one from the postero-inferior rim of the orbit, the other from the anterior rim, obliquely backwards across the cheeks and opercular apparatus.

SYN.—*Apodichthys violaceus*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 150.

Cebidichthys cristagalli, AYRES, in Proc. Cal. Acad. Nat. Sc. I, 1855, 58; Pl. I, figs. 1-3.

Cebidichthys violaceus, GRD. Gen. Rep. Fishes, 121.

Two immature individuals were obtained at Steilacoom, Puget Sound.

LUMPENUS ANGUILLARIS, Grd.

Eel-shaped Lumpenus.

PLATE XXVb, FIGS. 1-3.

SP. CH.—Head slender, continuous with the outline of the body. Gape of mouth slightly oblique. Posterior extremity of maxillar bone extending to a vertical line drawn midway between the anterior rim of the orbit and the pupil. Origin of dorsal fin situated opposite the base of the pectorals. Pectorals and caudal spear-shaped; greenish olive, upper regions maculated. Caudal fin transversely barred.

SYN.—*Blennius anguillaris*, PALL. Zoogr. Ross. Asiat. III, 1831, 176.

Gunnellus anguillaris, CUV. & VAL. His. Nat. Poiss. XI, 1836, 437.—STOREY, Synops. 1846, 121.

Leptogunnellus gracilis, AYRES, in Proc. Cal. Acad. Nat. Sc. I, 1855, 26.

Lumpenus anguillaris, GRD. Gen. Rep. Fishes, 123.

A single specimen was obtained from Bellingham bay. No notes were made concerning it.

PORICHTHYS NOTATUS, Grd.

Porous Catfish.

PLATE XXV.

SP. CH.—Upper surface of head quite flat. An acute preopercular spine stretching across the opercle. Posterior extremity of maxillar bone extending to a vertical line drawn posteriorly to the orbit. Four series of pores on either side of the body. A subgular and an abdominal series, as also several of these on the sides of the head. Upper regions dark bluish violet; sides and belly silvery gray. A sub-crescentic streak beneath the eye.

SYN.—*Porichthys notatus*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 141 and 151.—IBID. Gen. Rep. Fishes, 134.

An individual of this species is found in our collection made at Fort Steilacoom, Puget Sound. No notes, however, were made concerning it. Frequently isolated specimens already dead were sent to us by friends at a distance, so that the study of their habits during life was impossible.

MORRHUA?

Puget Sound Cod.

The *Ko-pel-la* of the NISQUALLIES, (GIBBS.)

A small codfish is quite common in Puget Sound. Near Fort Steilacoom they are taken rather abundantly between May and mid-summer, at which season they repair to the more shallow water, and are easily speared by the natives. Although scarcely exceeding four or five pounds in average weight, they are, for the table, equal to those taken on the Atlantic coast. Some which we salted and dried in the ordinary manner were excellent, and when cooked were preferred to the salt cod purchased in the shops. Mr. Gibbs informs me that cod are taken at Port Townsend as early as the middle of March.

The small codfish described by Dr. Girard as *Morrhua proxima* is probably also found in Puget Sound. It is, generally, not over five or six inches in length.

PLATICHTHYS RUGOSUS, Grd.

The Rough Flatfish.

Platichthys rugosus, GRD. Proc. Acad. Sc. Philad. VII, 1854, pp. 139 and 155.—IB. Gen. Rep. Fishes, p. 148.

SP. CH.—Eyes moderate, situated on the left side. Interocular space moderate. Peduncle of tail long; origin of dorsal fin corresponding to a vertical line intersecting the middle of the pupil. Scales very rugose and plate-like; lateral line slightly arched above the pectoral fins. Left side, reddish or olive brown; fins, olivaceous, dorsal and anal, with alternate vertical bands of black, longitudinal on tail. Ventrals and pectorals, unicolor. Right side, dull yellow, (white when fresh.)

This fish is abundant at Shoalwater bay during the warmer months; frequenting the flats and small channels among shoals. I never succeeded in catching it with a hook, nor have I heard of its being done. But by wading in the shallow pools left by the tide they may be taken in large numbers with the hand, net, or spear. They have a curious mode of escape, by darting rapidly to a muddy spot, stirring up the mud, and then returning suddenly to the place they started from. By carefully watching this trick they may be found half-buried in the mud where least expected.

The largest I have seen were about ten inches long.—C.

Several species of flounder and sole are common in Puget Sound. The latter are a little larger than the sole of the British waters, and somewhat thicker in proportion. The fins on their lower surface are frequently tinged with black. The smaller kinds, or flounders, are extremely numerous near Fort Steilacoom. They are readily caught at low tide, in water about four fathoms deep, with hooks baited with clam or other bait. The Indians spear great numbers in the shallow bays, and on the flats opposite the mouths of the rivers. When cooked they resemble the common flounder of the Atlantic, and although not very highly esteemed for the table, are yet, when well cooked, very good food.

EMBIOTOCA PERSPICABILIS, Grd.

Sapphire Perch.

PLATE XXXII & PLATE XXVI, FIGS. 1 & 2. VOL. X.

SP. CH.—Body sub-elliptically elongated. Frontal region gently declivous. Eyes of medium size. Posterior extremity of maxillary not quite reaching the interior rim of the orbit. Anal fin long, its anterior undivided rays longer than the rest, and its origin situated opposite the twelfth articulated ray or dorsal. Tips of pectorals reaching vertical line intersecting base of last dorsal spine. Five branchiostegal rays. Sixty-three scales in lateral line. Deep purplish blue above, lighter beneath. Flanks with light narrow longitudinal stripes intersecting the point of union of rows of scales. Dorsal, caudal, anal, and ventral fins reddish purple; pectorals yellowish.

SYN.—*Embiotoca perspicabilis*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1855, 321.—IB. Gen. Rep. Fishes, 178.

This viviparous perch is exceedingly abundant in the waters of Puget Sound, near Fort Steilacoom. It is a very handsome fish—perhaps, in its bright colors, the most striking of any found in those waters. A specimen, obtained in February, 1855, had eighteen *mazarine blue* streaks below the lateral line, running nearly parallel from gills to tail, and having both above and below the line a series of blue spots disposed crescentically beneath the eye and on the gill covers. The spaces between these spots were of an olivaceous color, changing, according to light, to resplendent golden and purplish green reflections. The blue of the back is of an indigo cast, and darker than that of the sides and belly, the streaks on the latter being separated by lines of golden yellow. Space between the pectoral fins golden.

These fish are taken by the Indians at all seasons, but more abundantly in June and July, when they are more frequently found in shallow water, and are speared. In July, 1856, vast numbers were taken by some friends of mine in a seine, at which time the sacs of the females were filled with young almost fully developed. The flesh of these fish was found flabby and insipid, resembling, though scarcely as good as that of the weak-fish of the New York markets. It would seem that they remain pregnant for a long time, as a specimen caught by me in February was found by Mr. Girard to contain eighty young, of an average size of half an inch, while those caught in July had their uterine sacs filled with young nearly one and three-quarters of an inch in length. Perhaps they bring forth several times a year.

DAMALICHTHYS VACCA, Grd.

Silvery Perch.

PLATE XXXIII.

SP. CH.—Male provided with a sub-pyriform sac upon the anterior third of anal. Branchiostegals, five on either side. Ground color grayish olive. Scales with a golden and silvery metallic reflect. Fins unicolor.

SYN.—*Damalichthys vacca*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1855, 321.—IB. Gen. Rep. Fishes, 182.

This fish, in external appearance and size, much resembling the porgee of Long Island sound, is almost as abundant as the preceding species in Puget Sound. It is readily taken with hook and line, and I have caught them with the "revolving spoon." When cooked it will rank as a good second-rate fish.

HOLCONOTUS RHODOTERUS, Agass.

The Golden-barred Perch.

Holconotus rhodoterus, AGASS. Amer. Jour. Sc. 2d ser. XVIII, 1854, p. 368.—GRD. Proc. Acad. Sc. Philad. VII, 1854, 141, 152, and 322.—IB. Gen. Rep. Fishes, p. 193.

SP. CH.—General form elongated, neither elliptical nor fusiform; frontal region sub-concave. Head sub-conical; mouth small; posterior extremity of maxillary not quite reaching the vertical line anterior to rim of orbit. Eyes rather large and circular; branchiostegals five. About forty-four scales in lateral line. Bluish gray or olive above, belly and sides silvery white, with three transverse bars of golden yellow, like finger marks.

In alcohol these disappear, and in some specimens "rose-colored rows of spots are seen."—C.

This species of fish, resembling in appearance the "white perch" of the eastern seacoast, comes into Shoalwater bay during May and June in great numbers, remaining until September, during which time the young are produced. They swim in schools near the surface, and often jump into boats and canoes—a habit which the Indians take advantage of to catch them, pushing their canoes along the high bank of channels at low tide, when the fish, crowded towards the shore, jump in. They will, however, often jump in when there seems no necessity for it, and sometimes even voluntarily leap high and dry on shore. I never saw any above tide-water in the rivers, nor have I seen the young fry after their birth. They rarely bite at a hook, though I have seen them caught in October when fishing for trout, with salmon roe for bait. They are pretty good as food, resembling perch.—C.

The only specimen of this fish that I obtained in Puget Sound I supposed was simply the young of the preceding species, and, in consequence, made no notes upon it.

PIMELODUS AILURUS, Grd.

Blunt-tailed Catfish.

PLATE XLIV.

SP. CH.—Head large, broad and depressed, constituting the fourth of the total length. Mouth large and wide; lower jaw the longest; maxillar barbel extending somewhat beyond the edge of the gill aperture. Eye small and sub-elliptical. Dorsal and pectoral fins interiorly serrated. Base of anal fin entering about five times and a half in the total length. Caudal fin somewhat emarginated posteriorly. Dark reddish brown above; whitish beneath.

SYN.—*Pimelodus ailurus*, GRD. Gen. Rep. Fishes, 1858, 210.

Several specimens of this fish were obtained from Lake Amelia, near Fort Snelling, Minnesota. In habits the species do not differ from their more eastern relatives. I saw none over a foot in length.

PIMELODUS OLIVACEUS, Grd.

Olive-colored Catfish.

PLATE XLI, FIGS. 1—3; and PLATE XLII, VOL. X.

SP. CH.—Body sub-fusiform, compressed. Head very much depressed and tapering, constituting about the fifth of the whole length. Mouth small; upper jaw the longest. Maxillar barbel extending to the middle of the pectoral fin. Eye large, sub-elliptical; its diameter contained five times and a half in the length of side of head, and about twice on the interocular space. Dorsal spine very finely serrated posteriorly; pectoral spine very strongly so. Caudal fin deeply furcated. Olive-brown above; olive-white beneath.

SYN.—*Pimelodus olivaceus*, GRD. Gen. Rep. Fishes, 1858, 211.

Two specimens of this catfish were obtained from the waters of Milk river. It is probably abundant in all the turbid affluents of the upper Missouri.

A larger species—one attaining an average weight of 12 pounds—is found in some of the tributary streams of the Red River of the North. Our command caught many of these at night with "set lines." We found them very palatable when cooked.

MYLOCHEILUS LATERALIS, Agass. & Pick.

PLATE XLV, FIGS. 5—8.

SP. CH.—Head constituting the fifth of the total length. Snout sub conical. Posterior extremity of the maxillary extending to a vertical line drawn across the hind nostril. Diameter of the eye entering five times and a half in the length of the side of the head. Anterior margin of dorsal fin equidistant between the extremity of the snout and the insertion of the caudal. Base of anal fin contained fourteen times in the total length.

SYN.—*Mylocheilus lateralis*, AGASS. & PICK. in Amer. Jour. of Sc. 2d ser. XIX, 1855, 231.—GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 169.—IBID. Gen. Report, Fishes, 214.

Several of these fish were preserved. They were obtained mostly from the fresh water lakes near Fort Steilacoom, where they are abundant. Like the other cyprinoids of Washington Territory, they are of but little value as food, being bony and insipid.

CARPIODES DAMALIS, Grd.

Deer-nosed Carp.

PLATE XLVIII, FIGS. 1—4.

SP. CH.—Head constituting the fifth part of the total length. Eye sub-circular, its diameter being contained four times and a half in the length of the side of the head. Angle of the mouth reaching a vertical line drawn in advance of the

pupil. Insertion of the ventral fins opposite the seventh ray of the dorsal. Caudal posteriorly concave. Dorsal fin anteriorly concave. Lower fins moderately developed. Scales deeper than long, grooved on all sides. Reddish brown above; silvery beneath.

SYN.—*Carpodes damalis*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 170.—IBID. Gen. Rep. Fishes, 218.

A large number of these fish were obtained from sunken pools on Milk river, Nebraska. When properly cooked they are not unpalatable.

ACOMUS LACTARIUS, Grd.

Milk River Sucker.

PLATE L.

SP. CH.—Head constituting somewhat less than the fifth of the total length. Mouth small; lips well developed, covered with uniform granules. Eye large, sub-circular; its diameter entering five times in the length of the side of the head. Anterior margin of dorsal fin somewhat nearer the insertion of the caudal than the extremity of the snout. Insertion of ventrals situated opposite the posterior half of the dorsal; their tip extending to the vent. Grayish brown above; grayish white beneath.

SYN.—*Catostomus (Acomus) lactarius*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 174.

Acomus lactarius, GRD. Gen. Rep. Fishes, 223.

This *sucker* was obtained by me in the lagoons along the course of the upper part of Milk river, Nebraska. At the season of the year in which I visited that locality, the bed of the river being dry in many places, these fish, with others, had retreated to deep holes and small stagnant lagoons in great numbers. With a small seine I was enabled to take, in a very brief space of time, many valuable ichthyological specimens, consisting of individuals of the present species, besides other cyprinoids, pike, perch, &c., some of which were carefully preserved for the national collection, and others afforded a welcome addition to our usual monotonous fare.

CATOSTOMUS SUCKLII, Grd.

Nebraska Sucker.

PLATE LI.

SP. CH.—Head constituting the fifth of the entire length. Eye small. Mouth rather small; lips moderately developed, covered with conspicuous papillæ. Isthmus of medium width. Dorsal fin as high as long; its anterior margin somewhat nearer the insertion of the caudal fin than the extremity of the snout. Insertion of ventrals a little in advance of the middle of the dorsal, and equidistant between the extremity of the snout and the fork of the caudal. Posterior extremity of anal extending beyond the rudimentary rays of the caudal. Grayish olive above; yellowish olive beneath.

SYN.—*Catostomus sucklii*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 175.—IBID. Gen. Rep. Fishes, 226.

The present fish is not uncommon in the upper Missouri and its tributaries, in the same localities as the last mentioned species.

In 1854 I noticed in one of the branches of Snake river, Oregon, a *sucker* of about the same size and of much the same general appearance as this. Its colors on the back, however, were darker. Owing to a deficiency in the means of transportation, and to other causes, I was unable to preserve this fish, which I regret the more because it was the only specimen of a genuine sucker (*catostomus*) that I saw west of the Rocky mountains.

PIMEPHALES FASCIATUS Grd.

SP. CH.—Body anteriorly stoutish, its depth being contained five times in the total length, in which the head enters four times and a half. Eye moderate and circular, its diameter being contained somewhat more than four times in the length of

the side of the head. Posterior extremity of maxillar bone not extending as far as a vertical line drawn in advance of the orbit. Extremities of ventrals stretching beyond the anterior edge of the anal. Scales deeper than long, elliptical; brown, fasciated with black.

SYN.—*Pimephales fasciatus*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 180.—IBID. Gen. Rep. Fishes, 234.

Several of these small fish were obtained at Milk river, Nebraska, where they are abundant.

HYBOGNATHUS ARGYRITIS, G r d .

Silvery Minnow.

PLATE LIII, FIGS. 5—8.

SP. CH.—Body sub-fusiform in profile. Head sub-conical, contained five times and a half in the total length. Eye large and sub-circular. Anterior margin of dorsal fin nearer the extremity of the snout than the base of the caudal. Insertion of ventrals equi-distant between the two points just alluded to in reference to the dorsal. Caudal fin entering four times and half in the total length. Scales anteriorly sub-truncated. Olivaceous brown above, yellowish beneath, with a silvery streak along the middle of the flanks. Fins unicolor, greyish olive.

SYN.—*Hybognathus argyritis*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 182.—IBID. Gen. Rep. Fishes, 235.

A few of these small fishes were taken from pools along the almost dry bed of Milk river, Nebraska.

ARGYREUS NUBILUS, G r d .

SP. CH.—Head rather small, constituting the fifth of the entire length. Mouth small, and barbel inconspicuous; lips cartilaginous. Eye moderate sized, sub-circular; its diameter entering five times in the length of the side of the head. Anterior margin of dorsal fin nearer the extremity of the snout than the tip of the middle rays of the caudal. Insertion of ventral fins equidistant between the angle of the mouth and the base of the caudal. Blackish brown above; dirty or dull white beneath.

SYN.—*Argyreus nubilus*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 186.—IBID. Gen. Rep. Fishes, 244.

Two specimens were obtained at Fort Steilacoom, Washington Territory.

POGONICHTHYS COMMUNIS, G r d .

Nebraska Dace.

PLATE LV, FIGS. 1—6.

SP. CH.—Head forming a little less than the fifth of the total length, its upper surface quite depressed in the adult. Snout rounded, depressed, and quite protruding. Gape of mouth nearly horizontal; lower jaw shorter than the upper. Posterior extremity of the maxillary extending to a vertical line drawn in front of the orbit. Anterior margin of dorsal fin much nearer the extremity of the snout than the base of the caudal. Insertion of ventrals placed somewhat posteriorly to the anterior margin of the dorsal, their anterior basal edge being nearer the tip of the snout than the base of the caudal. Lobes of caudal fin equally developed. Reddish gray above; whitish or yellowish beneath, with metallic reflects. Fins yellowish olive.

SYN.—*Pogonichthys communis*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 188.—IBID. Gen. Rep. Fishes, 247.

Found in sunken pools and lagoons along the line of Milk river, Nebraska, under similar circumstances as the *Acomus lactarius* already referred to. The species rarely attains a greater length than six or seven inches, and is of very indifferent quality for the table. A characteristic by which the fish may be readily recognized is the large size of its nostrils.

GOBIO GELIDUS, G r d .

U. S. & MEX. BOUNDARY, FISHES, PLATE XXIX, FIGS. 5—9.

SP. CH.—Head constituting the fifth of the entire length in which the caudal fin enters but four times and a half. Eye small, sub-elliptical, its horizontal diameter entering four times in the length of the side of the head. Body slender and tapering;

the anterior margin of the dorsal fin is nearer the extremity of the snout than the insertion of the caudal. Tip of pectoral; reaching to the base of the ventrals; tip of ventrals overlapping the vent, not extending quite to the anterior margin of the anal. Yellowish brown, with a silvery, superiorly dusky, streak along the middle of the flanks.

SYN.—*Gobio gelidus*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1856, 188.—IBID. Gen. Rep. Fishes, 248.

Two specimens were obtained from Milk river.

RICHARDSONIUS BALTEATUS, Grd.

Steilacoom Killy.

PLATE LX, FIGS. 1—4.

SP. CH.—Head forming less than the fifth of the total length. Snout sub-conical; jaws even; posterior extremity of maxillary bone extending to a vertical line drawn in front of the orbit. Eye large and circular, its diameter entering three times and a half in the length of the side of the head. Anterior margin of dorsal fin equidistant between the extremity of the snout and the fork of the caudal. Anal fin longer than deep and about as long as the head. Caudal fin constituting about the fourth of the total length. Grayish black above; silvery white beneath. Fins unicolor.

SYN.—*Cyprinus (Abramis) balteatus*, RICHARDS. Faun. Bor. Amer. III, 1836, 301.—STORER. Synops. 1846, 160

Richardsonius balteatus, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 202.—IBID. Gen. Rep. Fishes, 278.

This fish is very abundant in the small fresh water lakes near Fort Steilacoom. It is readily taken with the hook and line, and seems disposed to run in "schools." The flesh when cooked is soft and insipid, and as the bones are so numerous and troublesome it is rarely eaten.

RICHARDSONIUS LATERALIS, Grd.

Spotted Killy.

PLATE LX, FIGS. 5—8.

SP. CH.—Head constituting the fifth of the total length. Snout sub-conical; jaws even; posterior extremity of the maxillary extending to a vertical line drawn behind the nostrils. Eye large and circular, its diameter entering nearly four times in the length of the side of the head. Anterior margin of dorsal fin a little nearer the extremity of the snout than the fork of the caudal. Anal fin deeper than long and much shorter than the head. Caudal fin entering four times and a half in the total length. Blackish brown above; metallic yellowish white beneath, with a black streak above the lateral line. Fins unicolor.

SYN.—*Richardsonius lateralis*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 202.—IBID. Gen. Rep. Fishes, 279.

This fish is very plentiful in the same localities as the last mentioned species, of which it was taken by me to be a variety, or as simply differing in age. In habits, &c., it is precisely similar to the other. The colors given by Mr. Girard are those of fish which have been long in alcohol and of course differ from those freshly caught.

CHEONDA COOPERI, Grd.

Vancouver Chub.

PLATE LXIII, FIGS. 1—5.

SP. CH.—Body elongated, sub-fusiform in profile. Head contained a little short of five times in the total length. Snout thickish, sub-conical, overlapping somewhat the lower jaw; posterior extremity of the maxillary bone extending to a vertical line drawn behind the nostrils. Eye well developed; its diameter entering four times and a half in the length of the side of the head. Fins well developed. Upper regions reddish gray; sides and belly yellowish white with a metallic reflect.

SYN.—*Cheonda cooperi*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 207.—IBID. Gen. Rep. Fishes, p. 294.

This much resembles several other kinds of fish of the Territory, called generally "suckers," "bony fish," "carp," "red fin," &c., and like them all is considered poor food. It can easily

be taken with the hook at Vancouver, and probably also in other parts of the waters of the Columbia. No notes of its colors when fresh are preserved, but they did not differ much from the colors in alcohol, unless in wanting "reddish" on the back. The figure is of the size of life.—C.

PTYCHOCHEILUS OREGONENSIS, Grd.

Oregon Carp.

PLATE LXIV, FIGS. 5—9.

SP. CH.—Body sub-fusiform in profile. Head rather small, elongated; contained four times and a half in the total length; snout slender. Mouth deeply cleft: posterior extremity of maxillary extending to a vertical line intersecting almost the anterior rim of the pupil. Eye of moderate development; its diameter entering about five times in the length of the side of the head. Anterior margin of dorsal fin equidistant between the extremity of the snout and the fork of the caudal. Pectoral and ventral fins rather small.

SYN.—*Cyprinus* (*Leuciscus*) *oregonensis*, RICH. S. Faun. Bor. Amer. III, 1836, 305.

Ptychocheilus gracili, AGASS. & PICK. in Amer. Jour. of Sc. 2d ser. XIX, 1855, 229.

Ptychocheilus oregonensis, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 209.—IBID. Gen. Rep. Fishes, 298.

This fish is found in the Columbia near Fort Dalles, where I obtained a fine specimen about 14 inches in length. The species is readily taken with a hook baited with meat or worms; but as the flesh is of such a poor, insipid character, it is worthless when caught.

Colors of a female: back, deep blue; in certain lights, dark bluish olive; sides, for about half an inch above and below the lateral line, lighter, approaching to silvery; below the line a longitudinal band continues from the angle of the mouth across the *operculum*, bright straw yellow, its boundaries merging into the silvery blue, above and into the white of the abdomen below. Under surface, posterior to anus straw yellow; upper surface of head dark olive; chin and throat yellow; iris dark olive, yellowish orange, and maculated below. Dorsal fin and tail dark olive; anal and ventral orange. Thoracic anteriorly olive, beneath orange.

Family CLUPEIDAE. Herrings.

MELETTA COERULEA, Grd.

Puget Sound Herring

PLATE LXXV, FIGS. 5—7.

SP. CH.—Body slender, elongated, sub-fusiform in profile. Head constituting more than the fifth of the total length. Posterior extremity of maxillary bone extending to a vertical line drawn through the middle of the orbit. Eye large and sub-circular; its diameter entering four times and a half in the length of the side of the head. Anterior margin of dorsal fin nearer the extremity of the snout than the insertion of the caudal. Base of anal fin entering about ten times in the total length. Insertion of ventrals opposite the posterior third of the base of the dorsal fin. Bluish black above; yellowish or whitish beneath, with metallic reflections. Fins unicolor.

SYN.—*Meletta coerulea*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 138; &, 154.—IBID. Gen. Rep. Fishes, p. 330.

This fish, commonly known as the "herring," enters Shoalwater Bay in large numbers in June, and is then found at low tide stranded on the flats. It is a very good fish for eating when fresh, and would doubtless become an article of trade smoked, were there not so great an abundance of finer fish on the coast. It grows to the length of ten inches, and when fresh is steel blue above and shining white on the sides and beneath.—C.

According to Mr. Geo. Gibbs, the principal species of small "school-fish" which frequent Puget Sound are of four kinds. 1. The present fish, known to the Nisqually and Skaiwamish

Indians as the *Stole*, and to the Skadgets and Chemakums as *Löse*. 2. The *Washoos* (of the Skadgetts,) which has lately been scarce, was abundant formerly at Point Wilson and elsewhere about the sound. This is a summer fish, and when plentiful, are found in such compact "schools" that the Indians frequently shovel them ashore with their paddles. 3. The *Kwulusteo*, or eulachon. 4. The *Shehd-zoos*, found only at the Skadgett river. The last two kinds are related to the salmonidae, having adipose dorsal fins. Mr. Gibbs, writing from Port Townsend, Puget Sound, under date of March 24, again says: "The Indians have been taking herring in great numbers, quantities, rather, at Port Discovery, where the fishing is better than at Port Townsend. A very large weir of lattice-work, having but one entrance, was constructed on the flats. Within and around this weir a quantity of fir twigs were scattered, to which the spawn adhered. This is then dried on poles around the lodges. When dried, the substance, much resembling light brown sugar in appearance, is stripped from the twigs and carried off by the basket full. The fish entered the opening of the weir in great quantities, and when the tide fell the Indians went in and scooped them up. The weir was about eighty by fifty feet in extent. I am told that the Indians will take in this way as many as three tons of fish at a tide. Sometimes, when pursued by dog-fish, &c., the herring crowd so much as to pile one over the other and roll in masses on the beach." Again he says: "A friend informs me that there are three species (perhaps only three "runs") of herring. One, of middle size, comes in February and March. Another "run," in the beginning of April, is composed of larger fish, thicker in the body than the last, which is rather flat.* In June and throughout the summer a small kind, of the size of the sardine, is common. In August there is a very small silvery fish, three inches long, and not much larger than a lead pencil, which comes in immense numbers and is washed up by the tide. The Indians push them ashore with their paddles. This last species is probably the *Wash-oos*, already spoken of."—(GIBBS *in lit.*)

The present species of herring is quite common at Fort Steilacoom. The Indians, at certain seasons, take them by throwing or scooping them out of the water with poles, along the sides of which, for two or three feet, nails have been driven in closely together and their ends left standing out in rows resembling the teeth of a comb. These fish average about six inches in length, and despite the immense number of bones, are of excellent flavor and may be considered an agreeable table delicacy. The Indians eat great numbers, but they principally make use of them as bait when trolling for salmon. The herring is tied to a hook of the proper size, and gently trolled with a jerking motion. The natives, in this way, take many splendid salmon.

HYODON TERGISUS, Lesu.

Missouri Herring.

PLATE LXXV, FIGS. 1—4. (By error, figs. 4—7.)

SP. CH.—Head contained five times and a half in the total length; snout rounded, sub-conical. Posterior extremity of maxillar bone extending to a vertical line drawn posteriorly to the pupil. Eye very large, sub-circular; its diameter entering about four times in the length of the side of the head. Anterior margin of dorsal fin somewhat nearer the tip of the caudal than the occiput. Base of anal fin entering about four times in the total length. Insertion of ventrals nearer the extremity of the snout than the terminus of the anal.

SYN.—*Hyodon tergisus*, LESU. in Journ. Acad. Nat. Sc. Philad. I, 1, 1818, 366.—RICHARDS, Faun. Bor. Amer. III, 1836, 235.—KIRTL. Rep. Zool. Ohio, 1838, 170, and 195; &, in Bost. Journ. Nat. Hist. V, III, 1846, 338.—DEKAY, New Y. Faun. IV, 1842, 265; Pl. XLI, Fig. 130.—STORER, Synops. 1846, 210.—CUV. & VAL. Hist. Nat. Poiss. XIX, 1846, 309.—GIRARD, Gen. Rep. Fishes, P. R. R. Rep. X.

* Flat laterally?

The Missouri herring was obtained in Nebraska west of Fort Union. Others apparently similar were taken from the small tributary streams of the Red River of the North. They bite freely at a hook baited with meat, &c., but when captured are of but little use, as they are too bony to be of much value as food.

ENGRAULIS MORDAX, Grd.

Pacific Anchovy.

SP. CH.—Body slender, elongated, and sub-fusiform in profile. Head constituting the fourth of the total length; snout sub-conical. Posterior extremity of maxillar bone extending to the sub-opercle. Eye large and sub-circular; its diameter entering four times and a half in the length of the side of the head. Anterior margin of dorsal fin nearer the insertion of the caudal than the tip of the snout. Base of anal fin entering a little over seven times in the total length. Vent situated opposite the base of last ray of dorsal. Ventral fins small, their tips not reaching the vent. Pectorals rather short, posteriorly truncated. Deep bluish brown above; silvery beneath.

SYN.—*Engraulis mordax*, GRD. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 138 & 154.—IBID Gen. Rep. Fishes, p. 333.

This fish, almost exactly like the famed "anchovy" of Europe in appearance, is also excellent for the table when fresh. It abounds in Shoalwater bay at the same time as the preceding, and may be found in great numbers on the flats, at low tide, where basketsfull may be had for the trouble of picking them up. Like the herring, when fresh its back is dark olive and belly silvery white. All of both these fish have disappeared from the bay by September.—C.

This anchovy is probably the fish referred to by Mr. Gibbs as that known to the Skadgett Indians as the *Wash-oos*.—(See remarks under head of *Meletta caerulea*.)

SYNGNATHUS ARUNDINACEUS, Grd.

Pacific Pipe-fish.

SP. CH.—Head contained seven times in the total length, twice in that of the body. Anterior rim of the orbit equidistant between the apex of the snout and the insertion of the pectoral fins. Longitudinal diameter of the orbit entering eight times and a half in the length of the side of the head. Anterior margin of dorsal fin situated in advance of the anal aperture; its base, in the male sex, entering twice and a quarter of a time on the distance between the concavity of the thoracic belt and the anterior edge of the vent. Blackish brown, maculated beneath with golden yellow.

SYN.—*Syngnathus arundinaceus*, GRD. Gen. Rep. Fishes, 346.

A single specimen of this fish was presented to me by a ship captain, who had obtained it from some part of the California coast. No other facts were ascertained regarding its history.

AMIA OCELLICAUDA, Richards.

Marsh-fish; Dog-fish.

SP. CH.—An oblong black spot, with a lighter margin, obliquely situated at the base of the upper lobe of the caudal fin and inclined forwards. Head contained four times and a half in the total length. Insertion of ventrals nearer the base of the caudal than the extremity of the snout. Anterior margin of anal fin nearer the base of the pectorals than the posterior margin of the caudal.

SYN.—*Amia ocellicauda*, RICHARDS, Faun. Bor. Amer. III, 1836, 236.—Cuv. & VAL. Hist. Nat. Poiss, XIX, 1846, 422.—GRD. Gen. Rep. Fishes, 349.

The fresh water dog-fish is very common in the lakes near Fort Snelling, Minn. They attain a length of about 20 inches, and being proportionally stout will probably weigh three or four pounds. They readily bite at a hook covered with ordinary bait, and when hooked endeavor to escape by feats of strength and skill equal to those of fish of much higher repute.

Its flesh is soft and pulpy, and is popularly believed to be *poisonous*.

AMIA OCCIDENTALIS, De Kay.

Western Mud-Fish; Dog-Fish.

SP. CH.—Base of caudal fin without spot of any kind. Head constituting nearly the fifth of the total length. Insertion of ventrals nearly equidistant between the base of the caudal and the extremity of the snout. Anterior margin of the anal fin nearly equidistant, also, between the base of the pectorals and the posterior edge of the caudal fin.

SYN.—*Amia occidentalis*, DeKay, New Y. Faun. IV, 1842, 269; pl. xxxix, fig. 125.—Cuv. & Val. Hist. Nat. Poiss. XIX, 1846, 429.—GRD. Gen. Rep. Fishes, 350.

At the time I was in Minnesota I considered that these fish belonged to but one species—the last—and consequently made no special notes regarding the present kind. I think it probable that upon future investigation they will prove to be the same.

ACCIPENSER TRANSMONTANUS, Richards.

Columbia River Sturgeon.

SYN.—*Accipenser transmontanus*, RICHARDS, Faun. Bor. Amer. III, 1836, 278, pl. xcvi, fig. 2.—DeKay, New Y. Faun. IV, 1842, 347.—STORER, Synops. 1846, 248.—GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 137.

This sturgeon is very common in the Columbia and its larger branches. At Fort Dalles they arrive at about the middle of February, and are caught with hooks by the natives in moderate numbers. I suppose that, owing to the low stage of the river, they are not able to overcome the Dalles falls until about the middle of May. They are taken late in the season high up on Snake river, and I have heard of a single individual which was there taken near Fort Boisé which was fifteen feet in length. They are excellent eating, and are for that purpose justly prized by the Indians, who sell them, when scarce, at very high prices, charging a half dollar frequently for a small piece, scarcely weighing over a pound; indeed, the natives will frequently give a good pony in trade for a large sturgeon.

An individual obtained by me at Fort Dalles had the back *slate-brown*; spots on top of the head, dingy white; iris, *golden bronze*; chin and belly, *white*.

CHIMAERA COLLIEI, Benn.

Elephant Fish; the Skooma.

SP. CH.—Head constituting about the sixth of the total length. First dorsal fin sub-triangular; the upper margin, which is directed posteriorly, being crescent shaped, whilst the posterior margin, properly so to be called, is horizontal and parallel with the back, to which it is united by a thin membrane. Second dorsal quite low and elongated, its origin being nearly opposite the insertion of the ventrals, which is nearly half way between the apex of the snout and the origin of the caudal fin. Its upper margin is undulating. Either lobe of the caudal tapering regularly away towards the tip of the tail, the lower lobe extending somewhat further back. Skin perfectly smooth; brownish above; dull white beneath; the back and sides exhibiting numerous dull white rounded spots, variable in size.

SYN.—*Chimaera colliei*, BENN. in Zool. Beechey's Voy. to the Pacif. 1839, 71 Plate xxiii, figs. 1 and 2.—RICHARDS, Faun. Bor. Amer. III, 1836, 285.—GRD. Gen. Rep. Fishes, 360.

Elephant-fish, VANCOUVER.

Skooma, NISQUALLY INDIANS.

The elephant-fish is truly a curiosity to those who have never before seen it. It is quite abundant on Puget Sound, where it is known to many of the natives as the *skooma*. The first I obtained I caught at night on a hook baited with a piece of pork or other common bait. A few days afterwards I caught another, in shallow water, with my hands. They rarely attain a greater length than fourteen inches, and are quite oily and not ill flavored when cooked. By the Indians they are highly esteemed as food.

ACANTHIAS SUCKLEYI, Grd.

Western Dog-fish.

SP. CH.—Head constituting somewhat more than the sixth of the entire length. Snout very much depressed and elongated; nostrils nearer its apex than the angle of the mouth. Eyes large, elliptical, situated immediately in advance of the mouth. Anterior margin of first dorsal fin nearly equidistant between the pupil and the anterior margin of the second dorsal. A shallow caudal groove along the base of the upper lobe of the caudal. Dark grayish, with a few light irregularly scattered spots.

SYN.—*Spinax (Acanthias) suckleyi*, GRD in Proc. Acad. Nat. Sc. Philad. VII, 1854, 196.—IBID. Gen. Rep. Fishes, p. 368.

This shark is common at Shoalwater bay, and, in habits, seems to resemble closely its Atlantic congeners, being also commonly known by the same name, "dog-fish." It is equally troublesome to persons fishing in deep water, as it bites at anything used for bait, and, indeed, on the only occasion when I tried that style of fishing, it formed the principal part of our captures. Its usual size is from three to four feet long.

Its colors, when fresh, are as follows: *Adult*, pale liver-color above, with white spots, beneath white; slight bronze reflections above; iris pale sea-green. *Young*, grayish-brown above, with more brilliant gold-bronze tints, especially near the tail, spots purplish white; dorsal fin and tail tipped with brick red, more or less blood red on lower lobe of tail and belly, fading anteriorly; belly white, with gold reflections. These are the colors of the young when just produced. The specimens were caught in October and November.—C.

The present dog-fish is found abundantly in the waters of Puget Sound, and at certain seasons of the year repairs in vast numbers to the more shallow bays and flats off the mouths of its affluent streams. They attain, when adult, an average size of about three and a half or four feet; they are a voracious fish, readily caught with hook and line, and are not unfrequently taken by the natives with spears; their livers are large and very fat, the oil furnished by them being highly prized by the natives. It is for this latter that they are generally taken. The whites get much of the oil in trade, and use it for all purposes to which whale oil is applied. I have been assured, by an intelligent oil refiner, that the oil of this fish, when properly refined, is of a very excellent quality. I have used it, when *fresh*, as a substitute for cod-liver oil, as a medicine for consumptive patients. It seemed equally efficacious, and, in one or two cases, where the procurement of the latter was impossible, I was led to believe that it saved the lives of those taking it. It was given, with alcoholic liquors, in doses, commencing at two teaspoonfuls, increased gradually to a wine glass full, three times a day.

I obtained many specimens of the young, which, although six or eight inches long, were still attached by an umbilical cord to the "yolk-bag."

NOTE.—A very large shark was captured at Port Discovery in December, 1856. My informants told me that from its liver four barrels of oil were extracted! Mr. Gibbs subsequently obtained the skeleton and transmitted it to the national collection. Large sharks are very rare in Puget Sound; so rare that it is not improbable that they are stragglers which have followed the warm "Pacific gulf stream" from more southern regions.

RAJA COOPERI, Grd.

The Northwestern Skate.

Raja cooperi, GRD. Gen. Rep. Fishes, p. 372.

Length from tip of snout to root of tail, three feet six inches. Length of tail, two feet. Breadth across middle of belly, four feet two inches. Tip of snout to margin of mouth, eleven inches. Color, above entirely dark brown; below dull white.

Iris yellow. Snout and top of head thickly covered with short, recurved, hooked prickles, diminishing in size from the centre of head towards the circumference. Tail also thickly covered with the same, above and on the sides. No spine in tail. Cartilaginous expansions along its upper ridge, near the end. Convexity about the same on each surface of the body; snout rounded above, flat below. Tail nearly cylindrical; blunt.

In June and July, 1854, several large skates were washed ashore on the sand flats near the entrance of Shoalwater bay, which I had no means of preserving, but I took a sketch of one of the largest. Though I did not see any of them alive, I think they had entered the bay and were left by the ebb tide on some of the extensive sand bars, where they had died. I have never heard of their occurrence at any other season. The Indians will not eat them very often, but say they are not poisonous.—C.

A kind of stingaree or skate is not uncommon in Puget Sound. I saw, however, but one or two specimens, and was unable to preserve any. It is probably the same fish, described by Dr. Cooper as found at Shoalwater bay.

ICHTHYOMYZON CASTANEUS.

Chestnut Lamprey.

SP. CH.—Head depressed, constituting the ninth of the total length; body and tail compressed. Buccal disk sub-elliptical provided with a double series of short, tentacular fringes upon its periphery. Posterior margin of buccal aperture exhibiting a series of nine teeth, disposed upon an arc of a circle. Eyes small and inconspicuous. Spiracle sub-tubular, raised above the surface of the head. Origin of the dorsal fin equidistant between the anterior margin of the buccal disk and the apex of the tail. Vent situated immediately in advance of the most elevated portion of the dorsal fin. Chestnut colored, of a darker tint above than beneath.

SYN.—*Ichthyomyzon castaneus*, GRD. Gen. Rep. Fishes, 381.

A lamprey from Galena, Illinois.? Nothing was observed concerning its habits.

AMMOCOETES CIBARIUS, GRD.

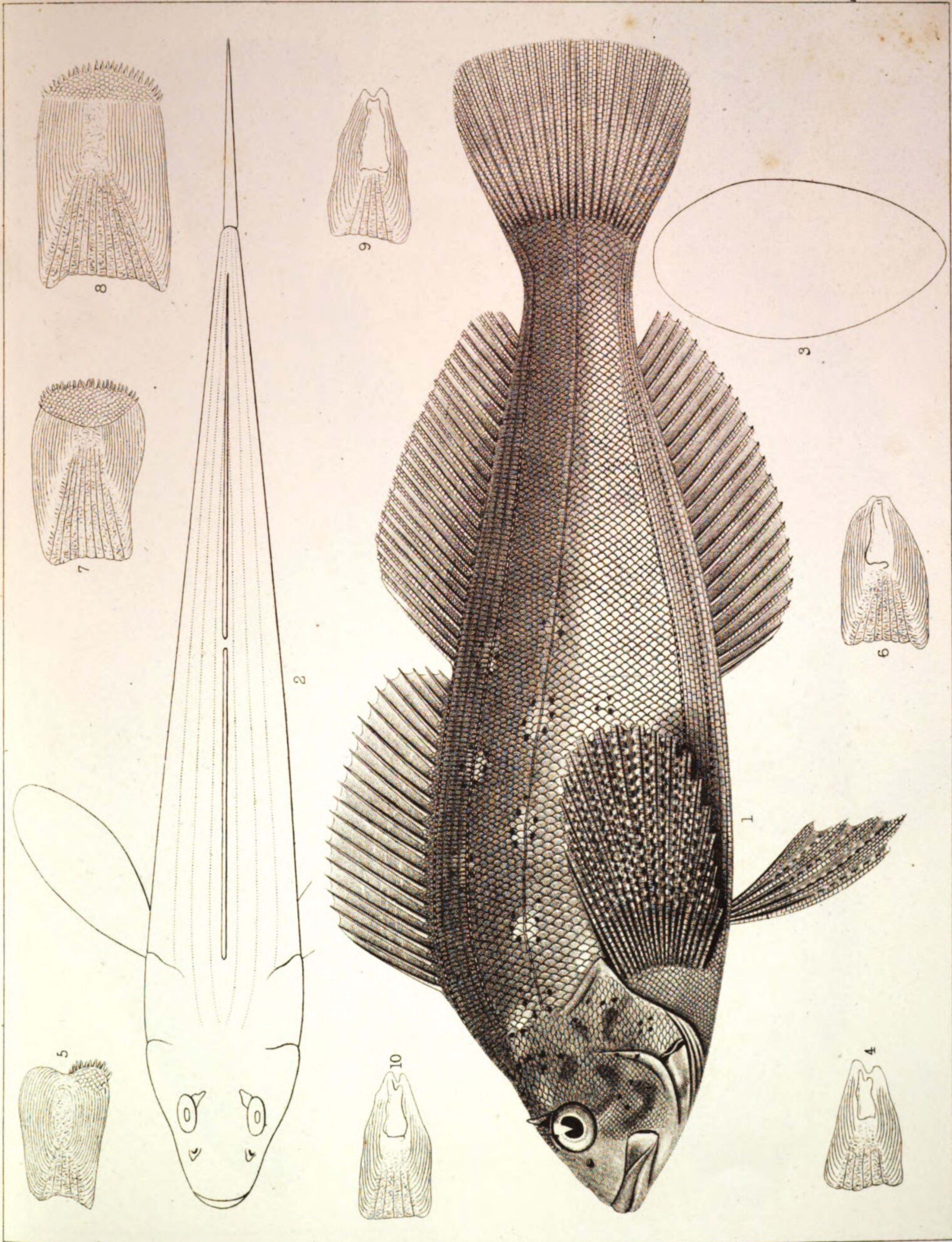
Pacific Sand Lance.

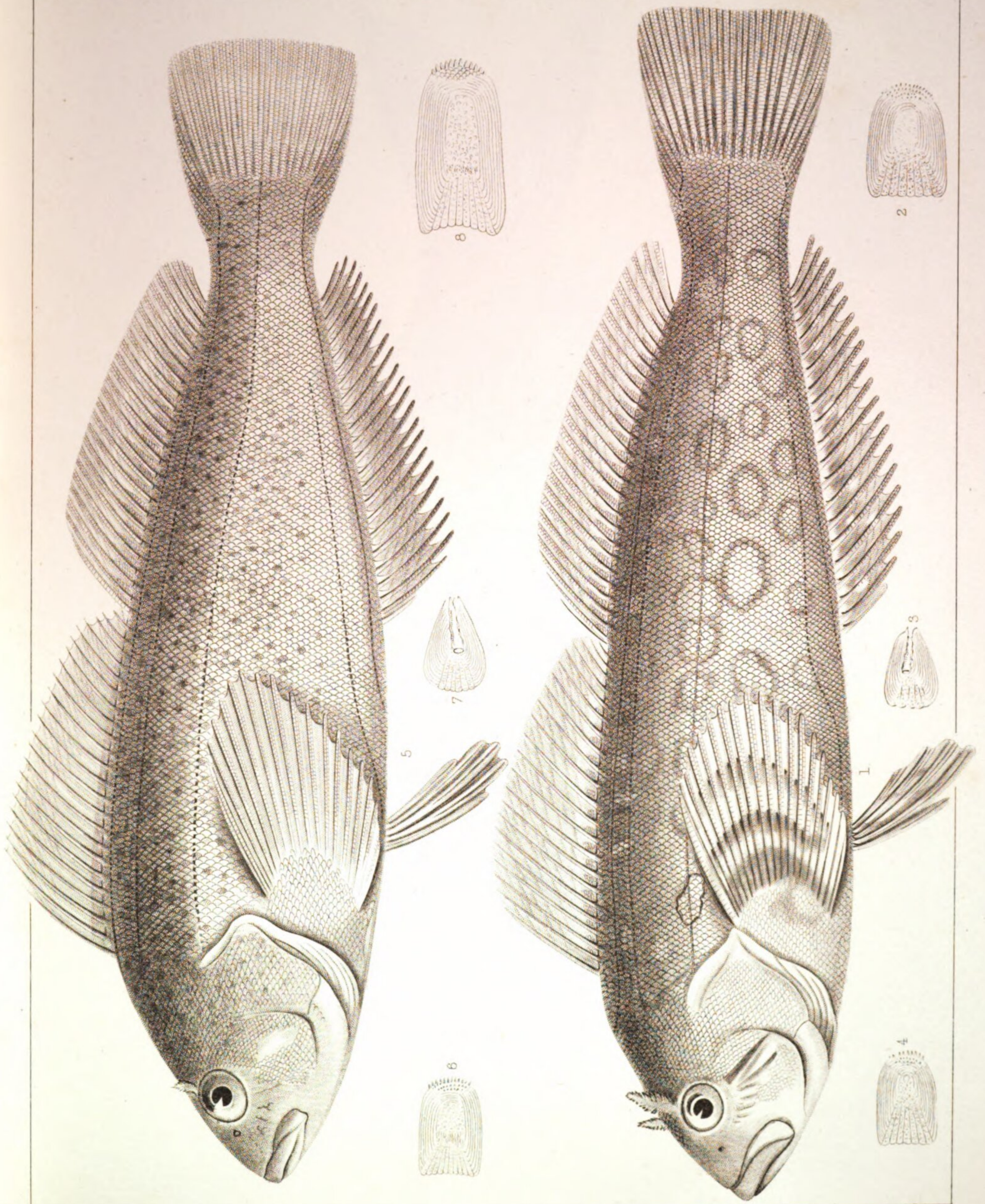
SP. CH.—Body sub-cylindrical, somewhat compressed posteriorly, with its surface annulated. Buccal disk sub-elliptical, interiorly papillated. Head and chest together contained four times and a half in the total length. Anterior dorsal fin lower than the second, and separated from it by a space not quite the half of its length. Anal fin very low. Deep olivaceous brown above; lighter beneath.

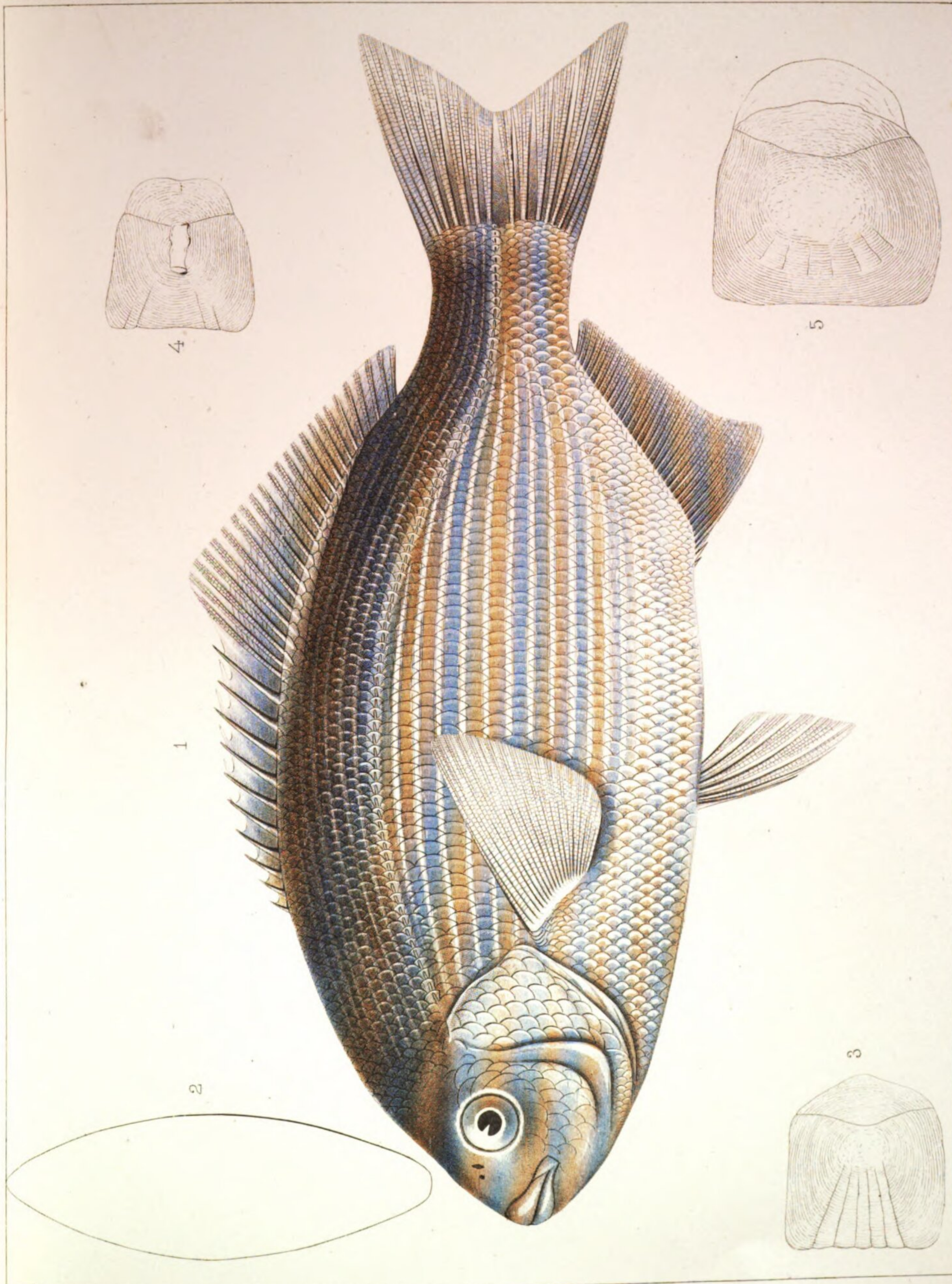
SYN.—*Ammocoetes cibarius*, GRD. Gen. Rep. Fishes, P. R. R. Surveys, vol. X, 1858, 383.

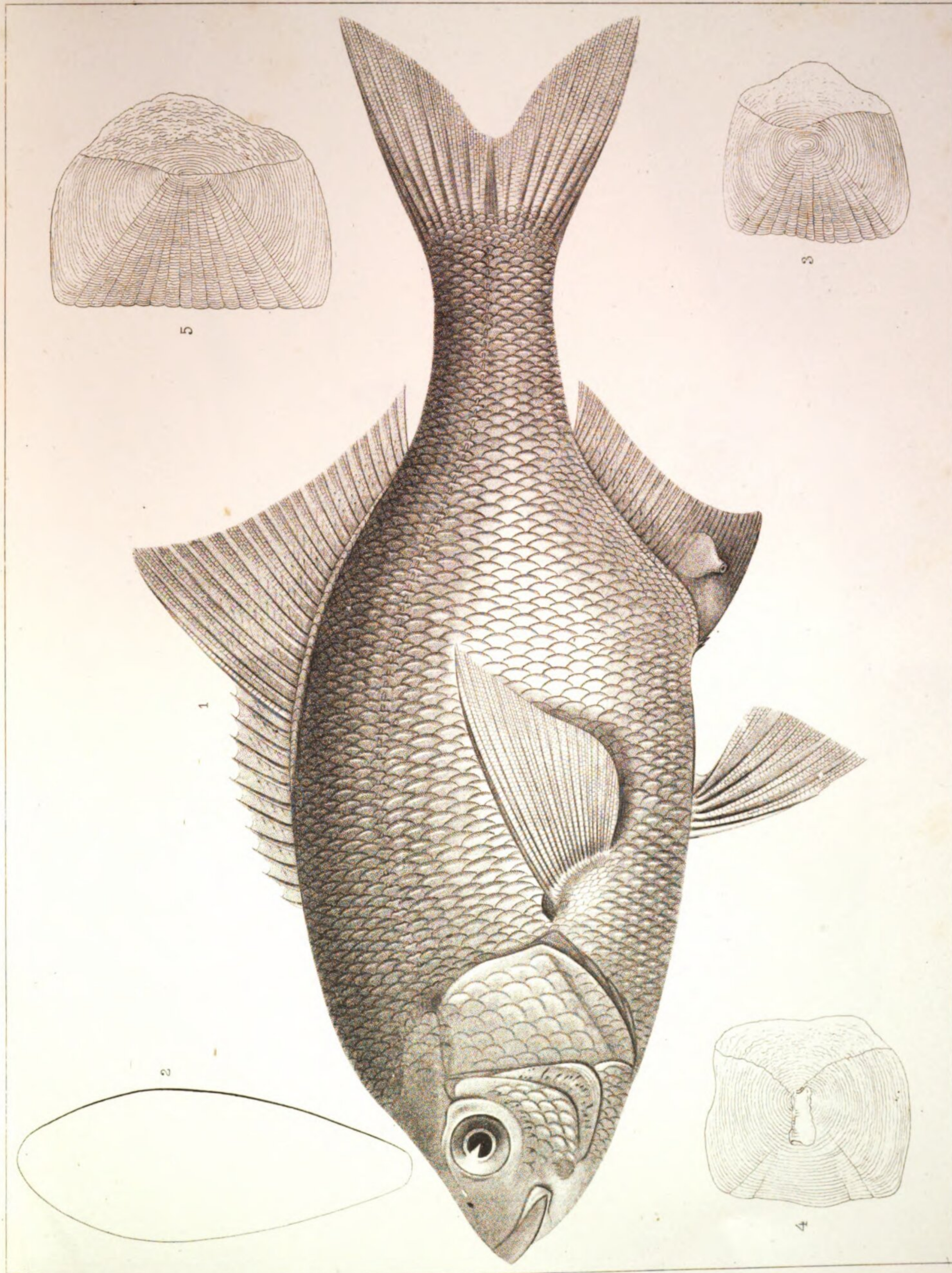


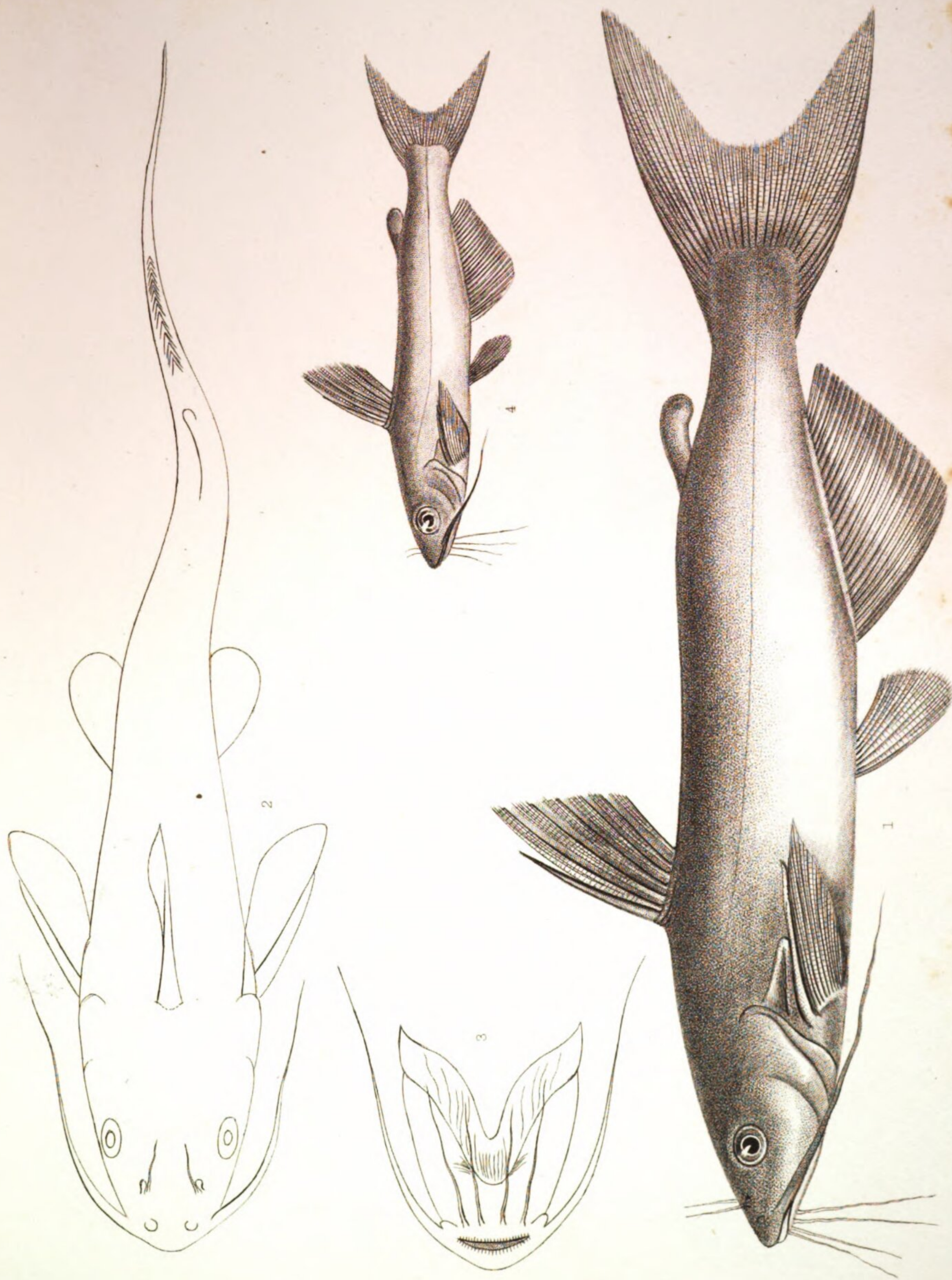


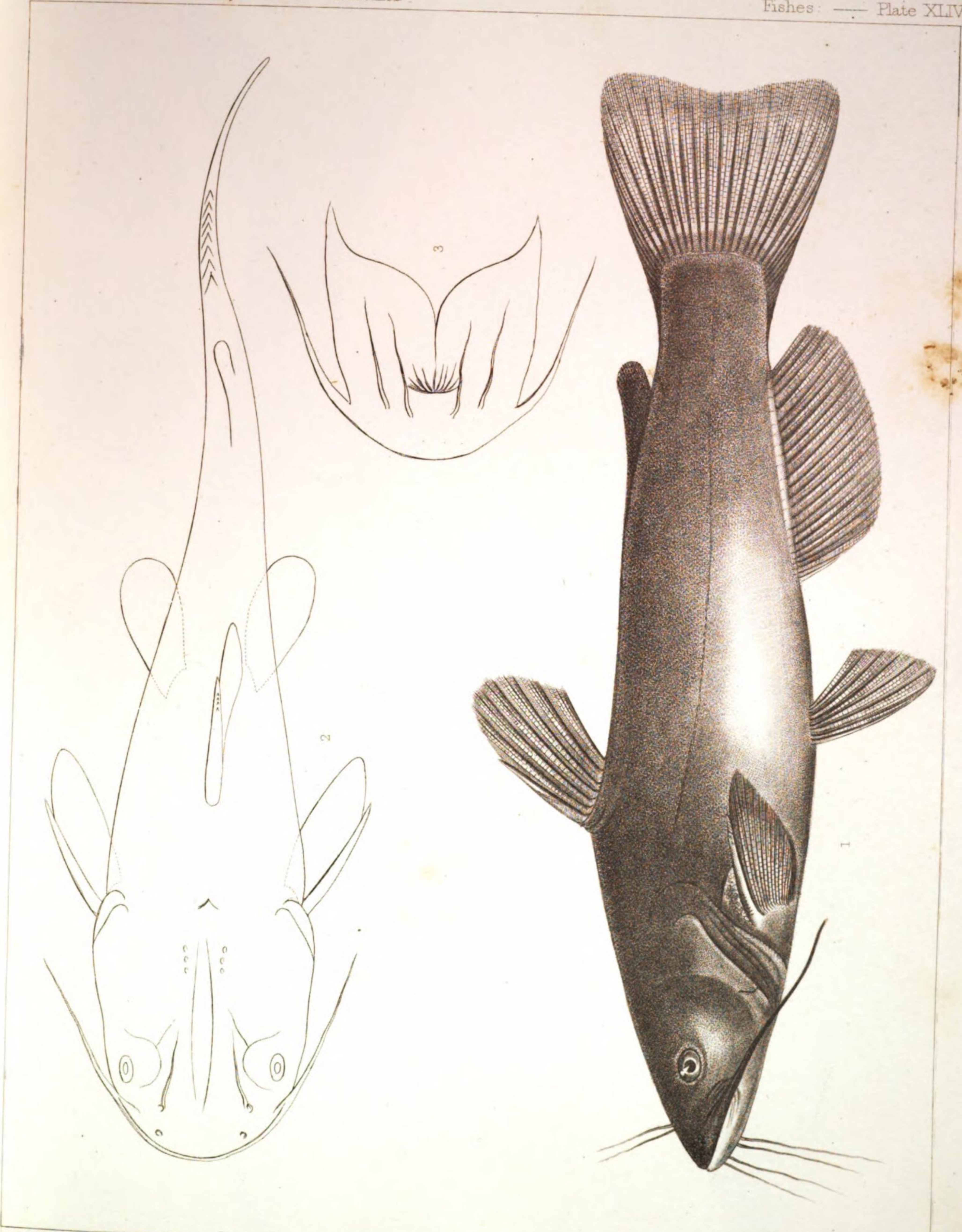


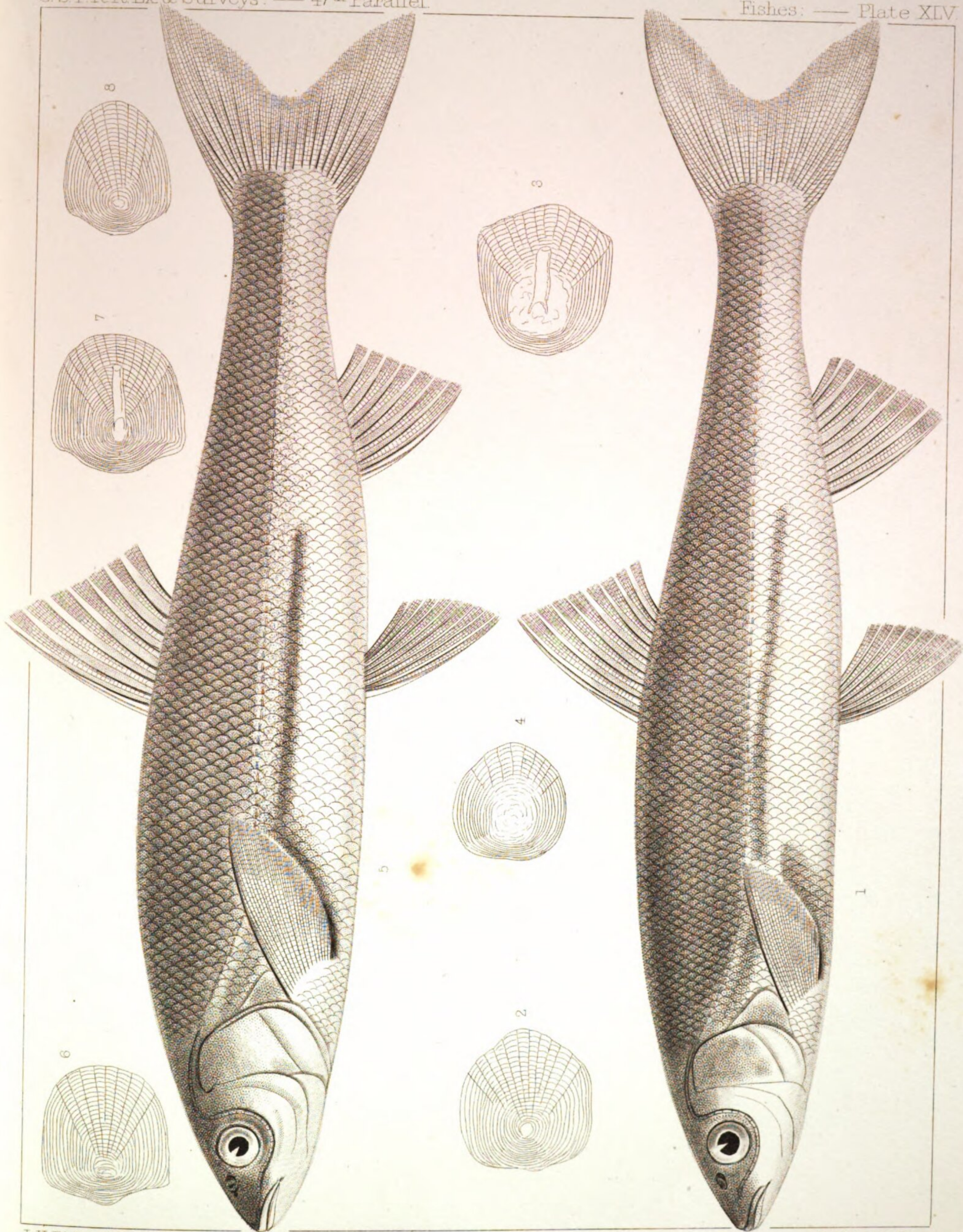


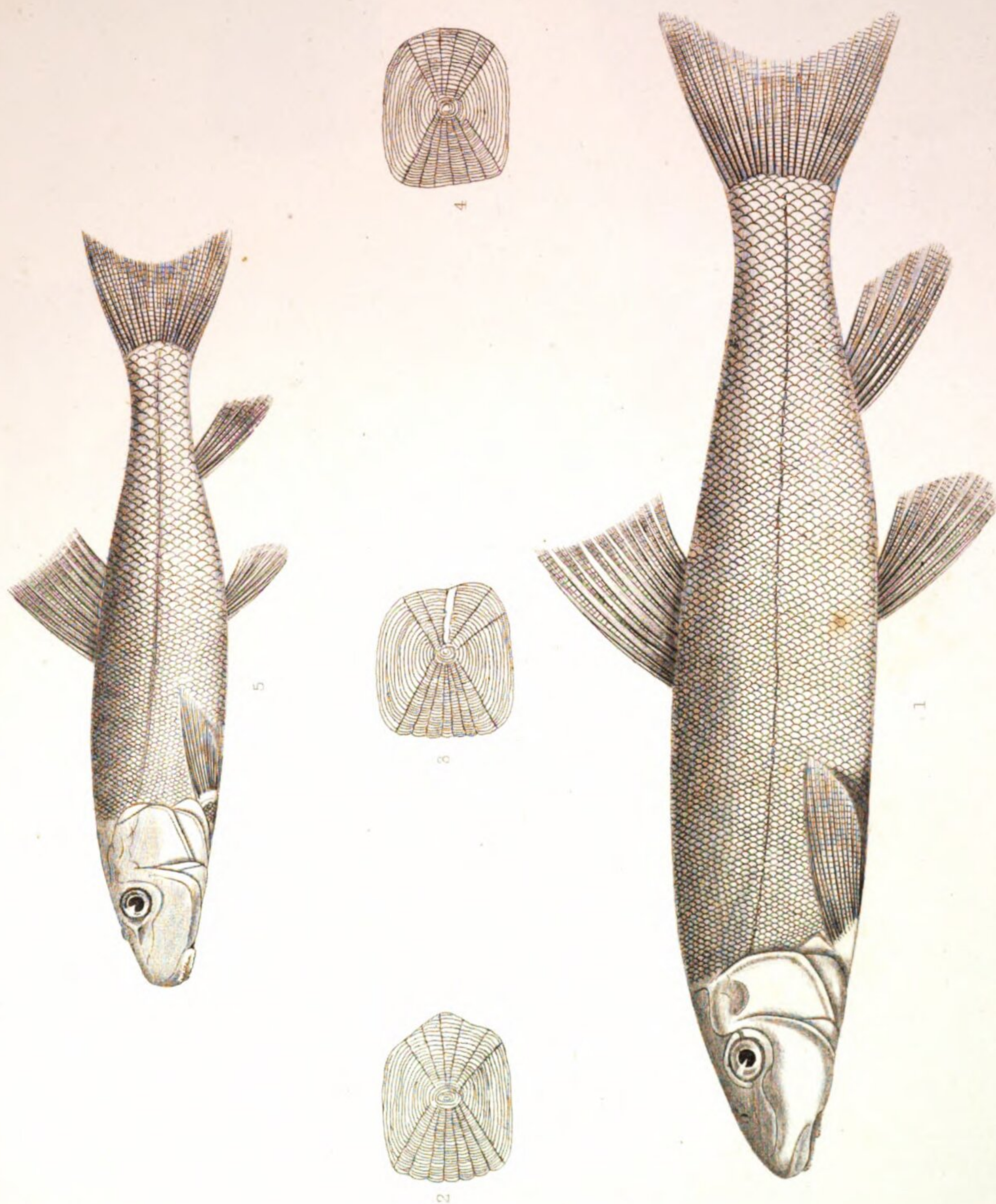


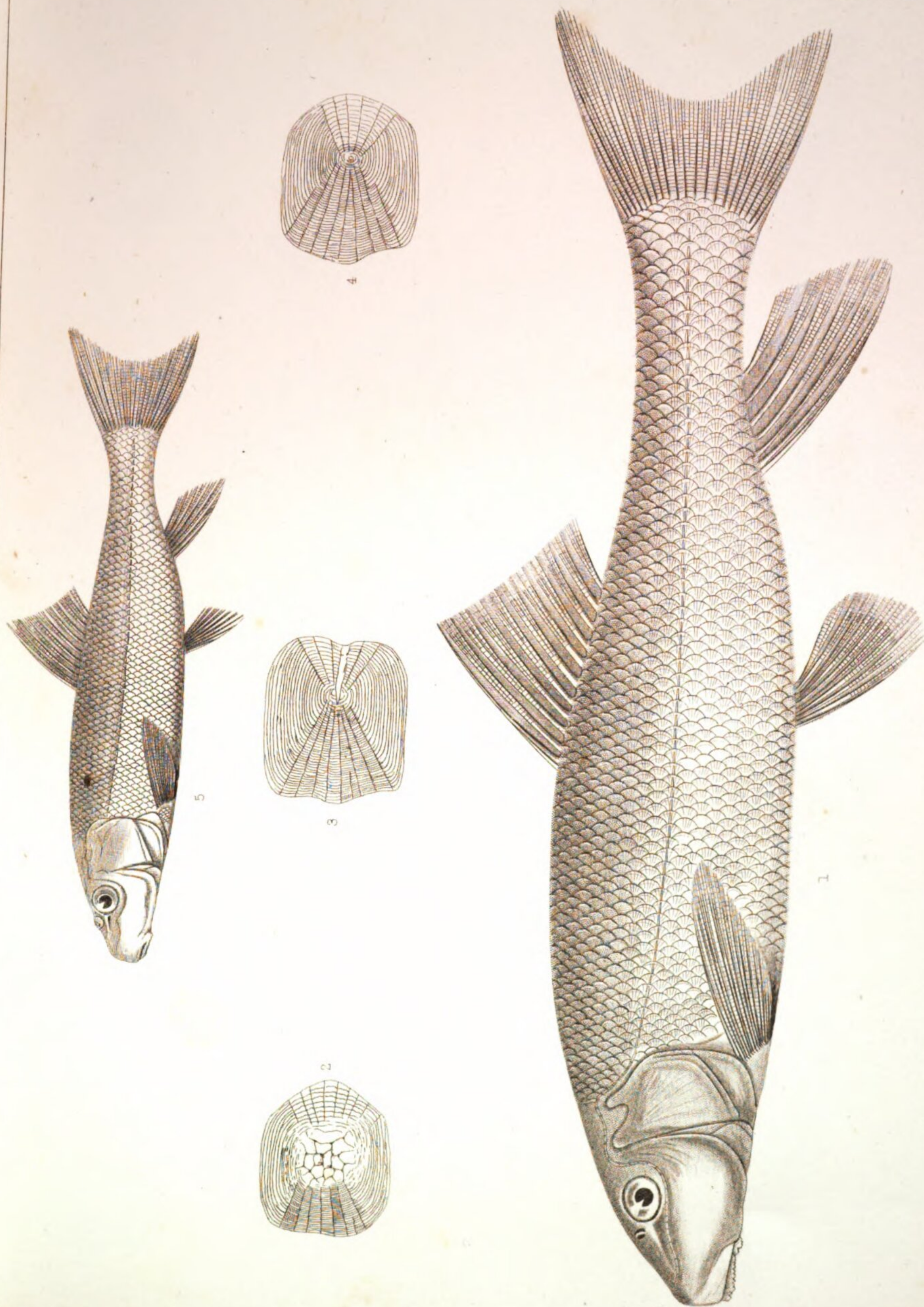


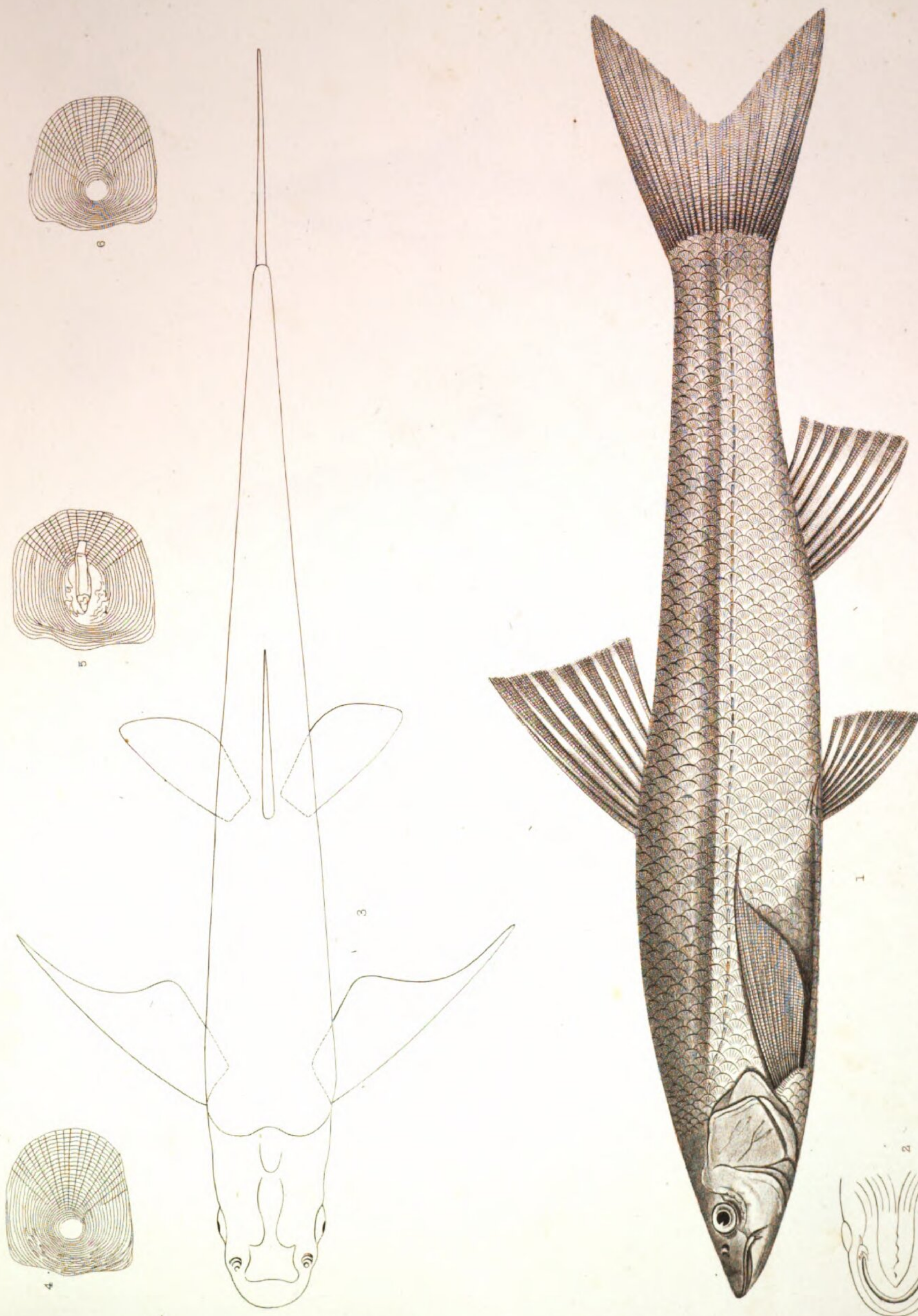


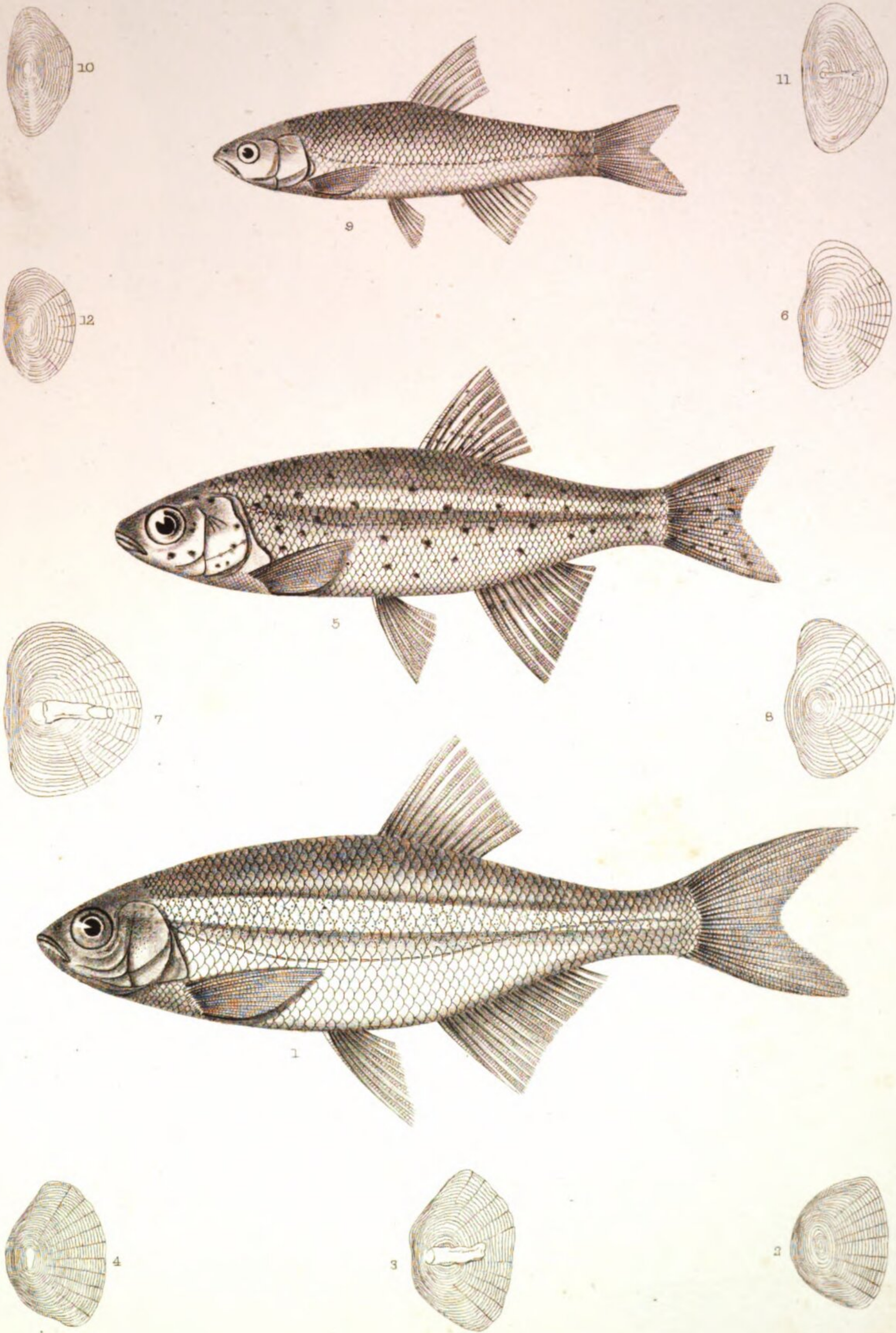




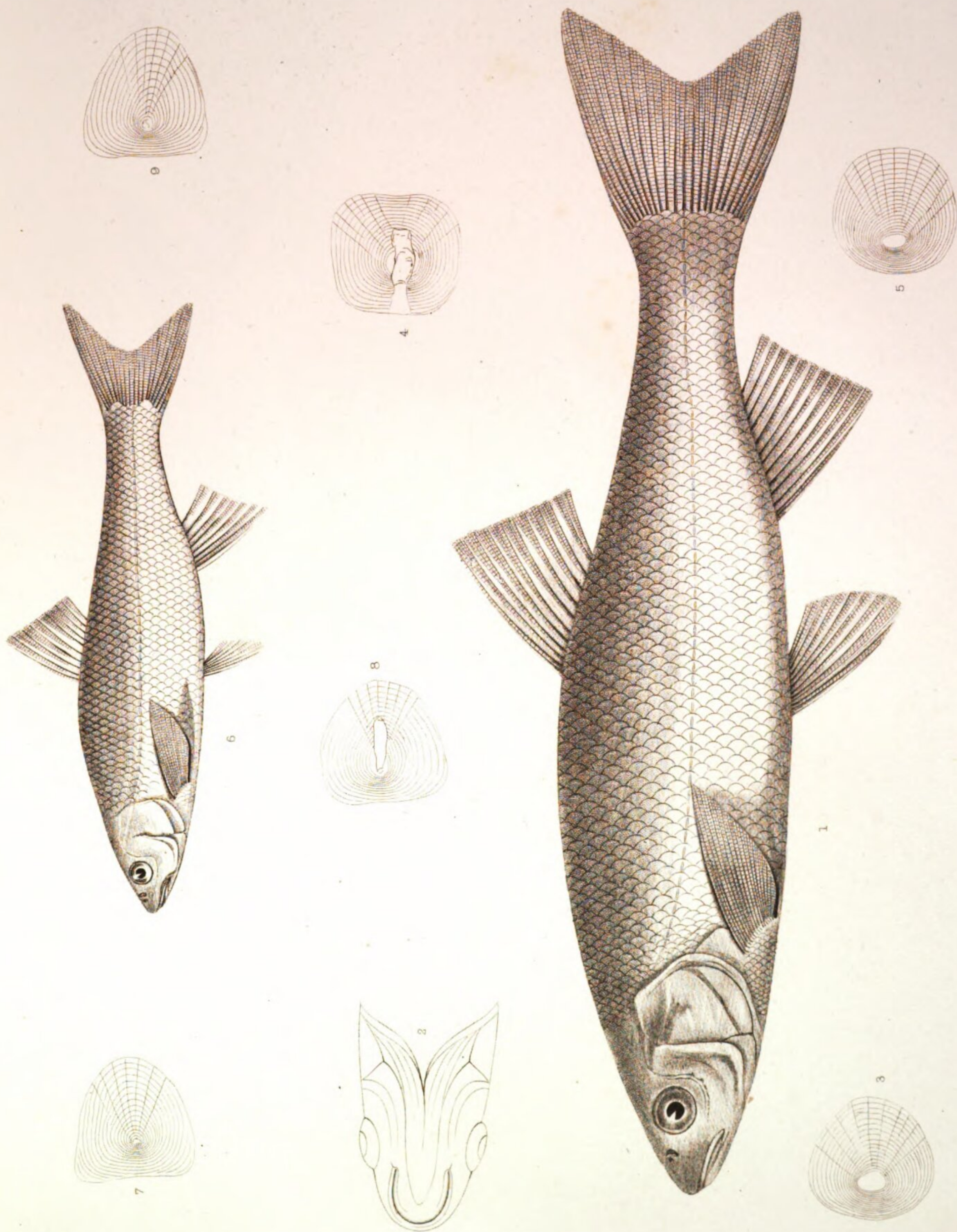


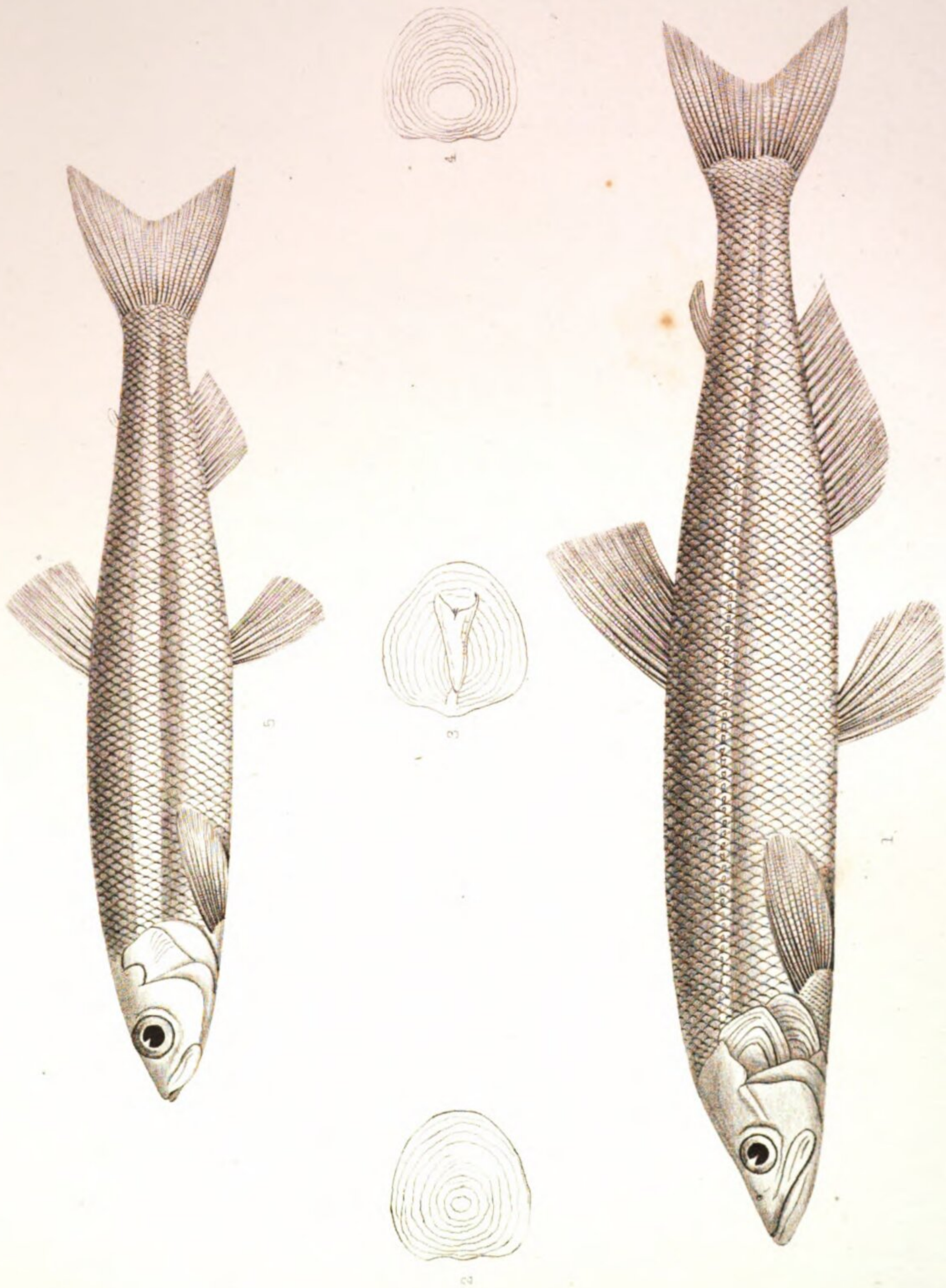












No. 6.

REPORT UPON THE MOLLUSCA COLLECTED ON THE SURVEY.

BY WILLIAM COOPER.

Class **MOLLUSCA**.—Shell-fish.

Family **MURICIDAE**.

MUREX FOLIATUS.

Murex foliatus, GMEL. Desh. Reeve, C. J. III, 12.

Murex monodon, ESCH. Zool. Atlas, Pt. II, p. 10, pl. 9, 10, f. 1, 1829.

Cerastoma monodon, CARPENTER, Report to Brit. Assoc. 1856, p. 345.

Cerastoma foliatum, IDEM l. c.

Hab.—Sitchea; Eschscholtz. Oregon; Kellett and Wood in Carp. p. 241. San Diego, (fossil?); Mr. Cassedy.

Sent from San Diego by Mr. Cassedy. Like others from the same locality which have been also found living, and some very remarkable species that have not, these specimens have the appearance of fossil shells. Eschscholtz collected it at Sitchea, in lat. 58°, as quoted by Reeve, though the name he gives is omitted by the latter.

MUREX FESTIVUS.

Murex festivus, HINDS, Zool. Sulphur, pl. 3, f. 13, 14.—REEVE, C. J. *Murex*, pl. xxvi, f. 114.

Pteronotus festivus, CARP. Rep. Brit. Assoc. 1856, p. 345.

Hab.—Bay of Magdalena; Hinds. San Diego; Mr. Cassedy.

This well marked species, which was dredged alive by Mr. Hinds in the Bay of Magdalena, is found of much larger size at San Diego. Only dead shells were sent, appearing like fossil or much weathered shells, but otherwise they entirely agree with Reeve's figure.

TRITON OREGONENSE.

Triton oregonense, REDFIELD, in Ann. Lyceum of Nat. Hist. of New York, IV, p. 165, pl. II, f. 2, (young?) 1839.

Tritonium (Buccinum) cancellatum, MIDDENDORFF, Beitrage, II, p. 164, pl. III, f. 1-4, (adult and young,) excl. syn. Lam. 1849.

Fusus oregonensis, REEVE, C. I. pl. xvi, p. 61, (young,) 1845.

Fusus cancellatus, REEVE, l. c, p. 62, (adult.)

Triton oregonense, GOULD, U. S. Expl. Exped. Moll. & Shells.

Triton cancellatum, (*oregonense*,) CARP. Rep. p. 338.

Hab.—Straits of Juan de Fuca; Dr. Suckley, Mr. Gibbs, Dr. Cooper. Unalashka; Middendorff. Kamtschatka; Reeve.

Among the specimens from the Straits of De Fuca is one adult shell, exhibiting the tooth or fold on the upper part of the columella, as it appears in Middendorff's plate, the absence of

which in his specimen was relied upon by Mr. Redfield as a good means of distinguishing his species from *Triton cancellatum* of Lamark. Dr. Gould, from the notes of Mr. Couthouy and Dr. Pickering, has described the animal of each, the one collected at the Straits of Magellan and the other at Puget Sound, considering them entirely distinct.

Reeve, and Dr. Gould after him, quote Jay as the author of the species, and original describer in the annals of the Lyceum of New York. Middendorff and Carpenter call the author Say. The credit is really due to Mr. J. H. Redfield, as above cited.

CHRYSDOMUS ANTIQUUS.

Chrysodomus antiquus, SWAINSON? Carpenter, Rep. p. 343.

Murex antiquus, LINN. Syst. Nat. ed. 12, L. Gmel. ed. 13.

Fusus antiquus, LAM. An. sans vert, ed. 2, IX, p. 447.

Tritonium (Fusus) antiquum, MIDD. Malacol. Ross. II, p. 131.

Trit. (Fus.) antiquum, var. *Behringiana*, MIDD. Reise, II, 224, pl. x, f. 3.

Hab —Straits of Juan de Fuca; Dr. Suckley. Behring's straits; Middendorff.

But one specimen of this species was obtained, which agrees with the variety from Behring's straits represented by Middendorff in his *Reise*, though showing still less carination on the penultimate whorl. The figures of his "varietates Behringianæ," in the "Beitrage," represent a different but allied variety.

CHRYSDOMUS MIDDENDORFFII, n. s.

Tritonium (Fusus) decemcostatum, MIDD (nec. Say) Beitrage, II, p. 138, pl. iv, fig. 15, (the sculpture only.)—CARP. Rep. p. 217. Omitted in his Gen. Catalogue, p. 343.

Hab.—Straits of Juan de Fuca; Dr. J. G. Cooper. Kodiak, Kenai; Middendorff.

DESCRIPTION.—Shell light horn color, the ribs darker, within white, tinged with violet; solid, ventricose-fusiform, the whorls convex, planulate on the upper part, encircled with strong well marked and elevated ribs, three to four on the whorls of the spire, ten to twelve on the last whorl, some near the canal less distinct, with intervening striae, which are more distinct forward; canal somewhat curved, equalling in length about two-thirds the breadth of the aperture. Length, 2.6 inches; breadth, 1.5; length of aperture, 1.7 inch.

This species is strikingly different from *Fusus decemcostatus*, Say, in the convexity of all the whorls, as well as in the angle formed in the outer lip by the termination of the first rib. The upper part of the last whorl is planulate, meeting the whorl above nearly at a right angle, while in the eastern species the same part is broadly excavated, rising steeply towards the suture. In the latter the penultimate and smaller whorls are made concave by the excavation between the two ribs which they generally exhibit, while the new species shows four on the penultimate and three on the smaller whorls. In *F. decemcostatus* the first rib is stronger and more prominent than those below it, while in the new species it is less so. Philippi's figure of Say's shell represents a variety, and not the normal state of the species. Our specimen of the new species is furnished with twelve more or less distinct ribs. The eastern shell, (from the examination of one hundred and thirty specimens,) appears to have seldom more than seven to eight, rarely nine ribs.

Fusus spitzbergensis, Reeve, (in Belcher's Arctic Voyage, II, p. 395, pl. 32, f. 6, a. b.,) is an allied, but, judging from the figure and description of Mr. Reeve, a very different species.

A single specimen collected by Dr. Cooper on the shore of Whidby's island, in the Straits of Fuca, with that described by Middendorff, are all at present known of this interesting species, first pointed out to me by Dr. Gould as the *F. decemcostatus* of Middendorff.

CHRYSDOMUS SITCHENSIS.

Chrysodomus sitchensis, CARP. Report to Brit. Assoc. 1856, p. 343.

Tritonium (Fusus) sitchense, MIDD. Malacol. Ross. II, p. 149, No. 14; pl. 2, figs. 5—8.

Hab.—Straits of Juan de Fuca, Dr. Suckley, G. Gibbs, esq; Sitka, Midd. after Eschscholtz.

Specimens of both mature and young shells were brought from the Straits of Fuca, where it appears to be rare. They agree, in all respects, with Middendorff's plate and description.

Family BUCCINIDÆ.

NASSA MENDICA.

Nassa mendica, GOULD, U. S. Expl. Exped. Mollusc & Shells, p. 263, and Atlas, fig. 331.

Hab.—Puget Sound, Dr. G. Suckley.

This as well as the following species appear to be rare.

NASSA GIBBSII, n. s.

DESCRIPTION.—Form short and moderately ventricose; whorls, six; the body whorl nearly equalling the spine in length, all cancellated, longitudinally ridged. Ridges, about 13 on each whorl, the intermediate furrows deep and equal in width to the ridges. Mouth subovate, canal spirally twisted.

Colors.—Inside of mouth dark purplish; epidermis smooth; olivaceous brown. Indistinct bands visible inside, which, under the epidermis, are found to be black or brown, varying in width and number, one usually distinct around the middle of whorl. Long. 0.40, lat. 0.25.

Five specimens of this *Nassa* more resemble *N. trivittata* than *N. mendica*, having the banding and shorter form of the former, their breadth being equal, but length proportionately much less than the latter, and, though smaller, their ridges are more strongly marked. Found dead along the shore at Port Townsend, Puget Sound. One only has a fresh appearance.

PURPURA LACTUCA.

Murex lactuca, ESCHSCHOLTZ, Zool. Atlas, II, p. 9; pl. ix, fig. 3, 1829.—MIDD. Beitrage, II, p. 120.

Murex ferrugineus, accidental variety, IDEM, id. pl. ix, p. 3.

Purpura septentrionalis, REEVE, Con. Icon. pl. x, p. 50.—JAY, in App. to Perry's Exp. to Japan, vol. II, pl. 5, figs. 16, 17.—

CARPENTER, Rep. to Brit. Assoc. p. 340.

Muricidea lactuca, CARPENTER, Report, p. 345.

Hab.—Sitka, Eschscholtz; Puget Sound, Dr. Suckley & Mr. Gibbs; Shoalwater bay and Straits of Fuca, Dr. Cooper.

This is a remarkable and abundant species, which, with Reeve, we prefer to place in the genus *Purpura*. Like others of that genus, it is subject to many variations, of which analogous examples may be observed in *P. lapillus* more especially. The figures given by Eschscholtz, Jay, and Reeve, represent three of these varieties, the first being at one, and the third at the other extreme of the series. After a careful comparison of more than two hundred individuals, from various localities in Washington Territory, we find the gradation from one to the other so regular that we are forced to refer them all to one species, first established by Eschscholtz.

"This shell abounds in the middle parts of Shoalwater bay on rocks and oyster-beds, and also in the deeper parts of Puget Sound. It appears to feed on oysters and other animal substances. I have found one adhering to an oyster, which was perforated by a small, round hole near the apex, and through which the 'periwinkle,' as they are popularly called, appeared to be devouring the animal. They can live several days out of water in damp places.

"The amount of rugosity seems to depend entirely upon the station the specimens are found

in. I obtained the most perfect adhering to rocks below low water, in a place where they were not likely to be rolled. Those found on oyster-beds are usually smooth, even when quite small.

"The form, also, seems to vary considerably in different localities; some from Puget Sound being much larger and more elongated, though found also of the usual form near by."—J. G. C.

PURPURA OSTRINA.

Purpura ostrina, GOULD, Expl. Exped. Shells., p. 244.—IDEM Atlas, fig. 310; CARP. Rep. p. 340.

"*Purpura Freycinetii*," MIDDENDORFF; non Desh.

Purpura decemecostata, MIDD. Beitrage II, 116; pl. ix, f. 1, 2, 3.

Hab.—Straits of Fuca; Puget's Sound; Dr. Cooper.

Quite a different species from *P. Freycinetii*, of Deshayes, with which it was confounded by Middendorff, though he also named and described it as new. Whether his or Dr. Gould's name has the priority I have not the means of deciding. On rocks above low water mark, from the mouth of Hood's Canal to Straits of Fuca; common.

PURPURA LAPILLUS.

Purpura lapillus, LINN, Midd. Gould, Carpenter; op. cit.

Hab.—Sitka Ochotsk; White sea; Middendorff. Straits of Juan de Fuca; Puget's Sound; Dr. Cooper.

Equally common with the last species, and found together with it.

PURPURA EMARGINATA.

Purpura emarginata, DESH. Rev. Zool. 1839.—Magasin de Zool. Moll. pl. 25; 1841.—REEVE, C. I. Pruss. x, p. 46. — CARP. Rep. p. 340.

Purpura Conradi, NUTT. Mss., Jay's Catal. No. 8972.

Hab.—Upper California; Dr. Trask. San Diego; Lieut. Trowbridge.

This shell is, no doubt, a California species, whence several were sent by Dr. Trask. Mr. Reeve mentions specimens in the British Museum, collected by Mr. Nuttall in that country. There is probably an error in M. Deshayes statement that it inhabits New Zealand.

MONOCEROS ENGONATUM.

Purpura (Monoceros) engonata, CONR. in Journ. Acad. Phila. VII, p. 26; pl. 20, p. 17.

"*Monoceros engonatum*, CONR." CARP. Report, p. 201.

"*Monoceros uncarinatum*, REEVE, C. I. sp. 1; new, pl. I, f. 1; nec. syn. pl.; non Sowb. nec. Desh."—CARP. Rep. 201.

"*Monoceros uncarinatum*, SOWB. var." JAY, Cat. No. 9067. N. B.—The type is quoted by Dr. Jay as synonymous with *Purpura spirata*, Blainville

Hab.—Bay of San Pedro, Upper California; Dr. Trask. Santa Barbara; Nuttall.

From the above citations, which might be further extended, it will be seen that there is much difference of opinion concerning the synonymy of this species. Our specimens, of which four were sent by Dr. Trask, agree entirely with Mr. Conrad's figure and description. They differ materially from Kiener's figure of *Purpura spirata* from the Sandwich Islands, and still more from Reeve's figure 2, specimen 1, of his plate I. At the same time they are possibly identical as species. This was first published by Mr Conrad in 1837.

MONOCEROS LAPILLOIDES.

Purpura (Monoceros) lapilloides, CONR, Journal Acad. Phil. VII, p. 264, pl. 20, fig. 18, 1837.

Monoceros punctature, GRAY, in Zool. Voyage of Blossom, 1839.—REEVE C. I. pl. 1, f. 1, species 2, Jay Cat. No. 9065.

Hab.—Bay of San Pedro, Dr. Trask; Santa Barbara, Nuttall.

Very different from the preceding species, as shown in our specimens, although Mr. Carpenter is inclined to consider them, with *M. uniden* Conr. as three varieties of the same. The published figures represent, it is true, what might be regarded as intermediate states of one species.

COLUMBELLA GAUSAPATA.

Columbella gausapata, GOULD, Proceed. Bost. Soc. Nat. Hist., III, p. 170, June, 1850.—IDEM, U. S. Expl. Exped.

Mol. & Shells, p. 369.—Atlas, fig. 337, Carp. Rep. p. 341.

Hab.—Oregon, Gould; Straits of de Fuca, Dr. Suckley.

COLUMBELLA VALGA.

Columbella valga, GOULD, Proceed. Bost. Soc. III, p. 169.—IDEM, Exped. Shells, p. 269.—Atlas, pl. 6, 338.

Hab.—Straits of de Fuca, Dr. Suckley.

The specimens sent of these two species were few and imperfect.

Family NATICIDÆ.

NATICA LEWISII.

Natica lewisii, GOULD, in Proceedings Bost. Soc. II, p. 239, 1847.—ID. in U. S. Expl. Exped. Mollusca & Shells.

Natica herculea, MIDDENDORFF, Beiträge Mal. Ross, II, p. 97, pl. vii, f. 5-7, 1849.

Natica herculea, CARPENTER, Rep. to Brit. Assoc. 1836, p. 336.

Natica lewisii, CARPENTER, Rep. to Brit. Assoc. 1836, p. 336.

Hab.—Puget Sound, Washington Territory, Dr. J. G. Cooper, Dr. G. Suckley; Bodega bay, Cal., Middendorff.

This fine large species, the western analogue of our *N. heros*, varies considerably in form, being sometimes remarkably globose, and at others with the spire much produced. Mr. Carpenter has erred in assigning the priority to Middendorff's name, his second volume, which contains the shells, being dated two years after Dr. Gould's publication. The name of the first explorer and collector in Oregon merited such a perpetuation.

"This large shell is abundant throughout the northwest sounds, and is collected in great numbers by the Indians for food. From May to August it may be found crawling out above high water mark to deposit its eggs, which are enclosed in a curious structure of sand, shaped like a shallow bowl without a bottom, or still more like some glass lamp shades, and beautifully symmetrical, smooth, and perfect on both sides."—J. G. C.

Family CERITHIADÆ.

POTAMIS PULLATUS.

Potamis pullatus, GOULD, in App. to Report of Explorations in California, vol. V, p. 333, pl. xi, f. 23, 24.

Cerithidæ pullata, CARP. Rep. to Brit. Assoc. 1856, p. 325.

Hab.—Upper California, Dr. Trask.

This species, which occurs in several localities on the coast of California, appears to vary in the number of varices, relative length, and other minor particulars.

Family MELANIADÆ.

MELANIA PLICIFERA.

Melania plicifera, LEA, on fresh water and land shells in Trans. Phil. Soc. of Phil., pl. xxiii, f. 90.—CARPENTER'S Report, p. 325.

Hab.—Very common in rivers of Washington Territory.—J. G. C.

MELANIA SILICULA.

Melania silicula, GOULD, Proceed. Bost. Soc. II, p. 224, 1847; Exped. Shells, 46. Carp. Rep., p. 325.—IDEM, Expl. Exped. Shells, p. 141, fig. 164.

Hab.—Rivers of Washington Territory, Dr. Cooper; Nisqually and Oregon, Dr. Gould.

MELANIA SHORTAENSIS.

Melania Shortaensis, LEA, in literis.

Hab.—Willopah river, Dr. Cooper.

AMNICOLA NUTTALLIANA.

Paludina Nuttalliana, LEA, in Philos. Trans. pl. xxvi, f. 89.

Hab.—Columbia river, Dr. Cooper.

AMNICOLA SEMINALIS.

Paludina seminalis, HINDS, Zool. Sulph. p. 59, pl. 16, f. 22.

Bithinia seminalis, CARP. Rep. p. 326.

Hab.—Upper California, Dr. Trask.

Family TURRITELLIDÆ.

TURRITELLA ESCHRICHTII.

Turritella eschrichtii, MIDDEND. Beitrage, II, p. 68, pl. xi. f. 1; Carp. Rep. 325.

Hab.—Puget Sound, Dr. Suckley, G. Gibbs, esq.; Arctic Sea, Middendorff.

A few specimens sent from Puget Sound agree in all respects with the figure and description given of this species by Middendorff, as cited above.

Family LITTORINIDÆ.

LITTORINA RUDIS.

Littorina rudis, GOULD, Stimpson, Shells of New England.

Littorina Barclayan? HINDS.

Hab.—Shoalwater bay to Straits of Fuca, Dr. Cooper, Dr. Suckley, G. Gibbs, esq.

Very abundant on the northwest coast, where it presents the same varied appearances as our eastern shell.

LITTORINA SCUTULATA.

Littorina scutulata, GOULD, Proceed. Bost. Soc. III, p. 83, March, 1849, Exped. Shells, p. 83.—IDEM, U. S. Expl. Exped. Moll. & Shells, p. 200, fig. 241.—CARP. Rep. p. 326.

Hab.—Puget Sound, Dr. Cooper; Puget Sound, Oregon, Dr. Pickering.

On rocks from the head of Puget Sound to the Straits of Fuca, having habits similar to those of *L. rudis*.—J. G. C.

LITTORINA PLANAXIS.

Littorina planaxis, NUTT. Sup. PHILIPP. Abbaldingen T. II, p. 201; Litt. Pt. IV, p. 16. Carp. Report, p. 326.

Hab.—San Luis Obispo, Dr. Antisell.

Family TURBINIDÆ.

TROCHUS FILOSUS.

Trochus filusus, WOOD, Ind. Test. Supp. pl. 5, f. 23, 1828.—CARPENTER, Rep. Brit. Assoc. p. 320.

Trochus ligatus, GOULD in Proceed. Bost. Soc. III, p. 91, 1847.—Exped. Shells, p. 185, fig. 207.

Trochus modestus, MIDDEN. ? Beit II. pl. 85, p. X, f. 16, 17, 18, 1849.

Hab.—Straits of De Fuca, Dr. Cooper; Upper California, Dr. Trask.

Not very common. *T. modestus* of Middendorff is considerably smaller, but otherwise much resembles this species.

29. TROCHUS SCHANTARICUS.

Trochus schontaricus, MIDDEN. Beitrage II, 85, 12.—IDEM, Reise, p. 204, pl. xviii, f. 1-7.

Hab.—Straits of Fuca, Dr. Cooper; Schantar islands in Sea of Ochotsk, Middendorff.

This small species appears to be abundant in the above locality, and numerous specimens were collected. They all exhibit more or less perfection beneath, and are uniform in size, which is much less than *T. filusus*. In other particulars the two are nearly allied.

Family HALIOTIDÆ.

HALIOTIS KAMTSCHATKIANA

Haliotis Kamtschatkiana, JONAS, REEVE, Con. Icon. III, f. 8.—CARPENTER, Rep. p. 320.

Hab.—Nootka Sound, Captain Russell.

Several specimens of this beautiful species of *Haliotis* were brought from Nootka Sound by Captain C. J. W. Russell, of which four were presented to us by Dr. Trask.

Young shells of *H. rufescens* bear considerable resemblance to this species, for which there is reason to think they have sometimes been mistaken. Among numerous specimens of *Haliotis*, sent to the Smithsonian Institution from different localities on the coast of California, I find none of this species from any more southern points than that given above, in latitude 49°. Mr. Carpenter also considers it doubtful as a California species.

HALIOTIS CORRUGATA, *H. SPLENDENS*, *H. RUFESCENS*, and *H. CRACHERODII* were sent from San Diego by Mr. Cassedy. *H. californiensis* must be rare, as none were obtained by any of our collectors or correspondents.

Family FISSURELLIDÆ.

FISSURELLA NIGROPUNCTATA.

Fissurella nigropunctata, SOWERBY, REEVE, op. cit.

Hab.—Santa Catalina, Dr. Trask; Gallapagos, Cuming; Panama, C. B. Adams.

Two specimens of this shell, hitherto only found in the Panama province, were sent by Dr. Trask as coming from the island of Santa Catalina, near the coast of Upper California.

FISSURELLA ASPERA.

Fissurella aspera, ESCHSCHOLTZ, CARP. Rep. 320, (*Glyphis*.)

Fissurella cratilia, GOULD?

Fissurella denseclathrata, REEVE?

Hab.—Upper California, Lieut. W. P. Trowbridge; Puget Sound, Dr. Gould.

Family PATELLIDÆ.

Very few shells of this family were collected. Among the imperfect specimens, of which they mostly consist, we can recognize, with some doubt, the following species, adopting the nomenclature of Mr. Carpenter, the best authority upon this branch of conchology. For an extended synonymy the reader is referred to his excellent "Report to the British Association, 1857."

NACELLA INSTABILIS, ACMÆA PELTA, A. PERSONA, A. SPECTRUM, A. SCABRA, A. ÆRUGINOSA, SCURRIA MITRA.

Family CHITONIDÆ.

We find in the collections sent home still fewer materials, either specimens or notes, relating to this family than to the previous one. The following were identified, and are chiefly from the coast of Oregon:

CHITON MUSCOSUS, C. SUBMARMOREUS, C. TUNICATUS, C. LIGNOSUS.

Family HELICIDÆ.

HELIX FIDELIS.

Helix fidelis, GRAY, in Proceed. Zool. Soc. 1834, Carp. p. 314.

Helix Nuttalliana, LEA, in Philos. Trans. 1838, pl. XXIII, f. 74.

Hab.—Washington Territory, Dr. Cooper.

"This beautiful species is apparently limited to the forests west of the Cascade mountains, where it is common under evergreens in the drier situations. I have found one sticking to a small tree about three feet from the ground, but do not know of its ascending trees habitually. Its eggs, white, pellucid, and as large as a duck shot, are deposited in April under rotten wood. Young specimens are very rare. I found this shell throughout the valleys from Vancouver to the Straits of De Fuca, and more rarely near the coast, where it is smaller in size."—J. G. C.

HELIX TOWNSENDIANA.

Helix Townsendiana, LEA, in Trans. Philos. Soc. pl. XXIII, f. 80.—CARP. Rep. p. 314.

Hab.—Washington Territory, Dr. Cooper.

"This is the most abundant species, especially along the coast, where, unlike most of our American forest snails, it frequents open prairies among the fern. It is particularly abundant on low, sandy bars just above high tide, which are covered with a deep, rich deposit of shell marl, and have been formerly favorite camping grounds of the Indians. These places, being very productive, are much cultivated by the whites; and immense numbers of this animal's shells are found when the grass and bushes are first burnt off. They continue to live in potato fields in the same places. The bare face of Cape Disappointment fronting the ocean is also a locality. I did not find this species about Puget Sound."—J. G. C.

HELIX COLUMBIANA.

Helix columbiana, LEA, in Trans. Philos. Soc. pl. XXIII, f. 75.—CARP. Report, p. 314.

Helix labiosa, GOULD, U. S. Expl. Exped. Moll. and Shells.

Hab.—Washington Territory, Dr. Cooper.

"This little species is found in wet stations about meadows, &c., from Vancouver to the coast, where it is most abundant, under drift logs, &c., high up on the meadows, which are occasionally overflowed by the tide. It is also rarely found under trees. I did not obtain any at Puget Sound."—C.

HELIX VANCOUVERENSIS.

Helix vancouverensis, LEA, in Trans. Philos. Soc. pl. XXIII, f. 72.

Hab.—Washington Territory; Dr. Cooper.

"*H. Vancouverensis* is found west of the Cascade mountains, most abundant under the alder groves along the coast in damp places; also occasionally with *H. Townsendiana*. The animal is entirely of a yellowish white color. Some are also found on Whidby's island."—C.

HELIX DEVIA.

Helix devia, GOULD, Exped., Shells, p. —.

Helix Baskervillei, PFR. REEVE, C. I. pl. —, f. —.

Hab.—Washington Territory; Dr. Cooper.

Inhabits damp woods near Vancouver. Only two specimens were found.—C.

HELIX TUDICULATA.

Helix tudiculata, BINNEY, Terrestrial Molluscs.

Hab.—Washington Territory; Dr. Cooper.

This is also a rare species in Washington Territory, and is found with the preceding.—C.

SUCCINEA NUTTALLIANA.

Succinea nuttalliana, LEA, Proc. Am. Phil. Soc., vol. II, p. 32; Trans. of ditto, vol. IX, p. 4; PFEIFFER, Mon. Hel. Viv. I, 523, III, 15; BINNEY, Terr. Moll. U. S. II, 81; pl. LXVIIa, fig. 4.

Found at Vancouver, where it is apparently rare, and was not observed alive.—C.

Family LIMACEÆ.

LIMAX COLUMBIANUS.

The Columbian Slug.

Limax columbianus, GOULD, in Binney's Terr. Moll. U. S., II, 43; pl. LXVI, fig. 1.—U. S. Ex. Exped. Moll., p. 3, fig. 1, a. b. c.

This large slug abounds in the dense damp spruce forests near the Pacific coast, and was not observed by me in the dry region east of the Cascade mountains. It is to be found during every month of the year in Washington Territory, being even more abundant in the rainy winter than in warmer seasons; its activity being checked only by severe cold, while it cannot bear continued drought.

It not unfrequently drops from the trees, but whether it ascends to any great height I have not observed. Though apparently offering a tempting meal to birds and other animals I never knew them to devour it.

This slug grows to the length of six inches, but shrinks to a third of that size in alcohol. Its

surface is smooth, not rugose, when alive, as represented in Dr. Binney's plate, and its color is a pale yellowish olive, usually more or less irregularly blotched with black.—C.

Family LYMNÆADÆ.

LYMNÆA UMBROSA.

Lymnæa umbrosa, GOULD.

Hab.—Lake Oyosa, on the Okanagan river, near lat. 49°; Dr. Cooper.

LYMNÆA EMARGINATA.

Lymnæa emarginata, SAY.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper.

LYMNÆA JUGULARIS.

Lymnæa jugularis, SAY.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper.

PHYSA ELONGATA.

Physa elongata, SAY.

Hab.—Near Puget Sound; Dr. Cooper.

PHYSA HETEROSTROPHA.

Physa heterostropha, SAY.

Hab.—Ponds in Washington Territory; Dr. Cooper.

PHYSA BULLATA.

Physa bullata, GOULD, MS.

Hab.—Lake Oyosa, Washington Territory; Dr. Cooper.

ANCYLUS CAURINUS, n. s.?

Hab.—Black river, near Puget Sound; Dr. Cooper.

PLANORBIS CORPULENTUS.

Planorbis corpulentus, SAY.

Hab.—Lake Oyosa, Okanagan river; Dr. Cooper.

PLANORBIS TRIVOLVIS.

Planorbis trivolvis, SAY.

Hab.—Near Vancouver; Dr. Cooper.

"Exceedingly abundant in shallow lakes about Vancouver, the dead shells lining the shores."—C.

PLANORBIS PLANULATUS, n. s.

Hab.—Lakes on Whidby's island; Dr. Cooper.

A small carinated species, flat above, convex below, having much the appearance of a *valvata*, found only in lakes on Whidby's island, at the entrance of Puget Sound.

Family BULLIDÆ.

BULLA NEBULOSA.

Bulla nebulosa, GOULD, SOWERBY, Thes. f. 79, 80.

Hab.—Bay of San Pedro; Dr. Trask.

BULLA TENELLA.

Bulla tenella, ADAMS, SOWERBY, Thes. pl. 134, f. 104.

Hab.—Puget Sound; Dr. Suckley.

The habitat of Adams' shell is not known. A specimen from Puget Sound agrees very well with Sowerby; figure and description quoted above.

Family OSTREIDÆ.

OSTREA EDULIS.

Ostrea edulis, LINN. LAM.

Hab.—Shoalwater bay Wash. Terr.; Dr. Cooper.—Straits of Fuca and Puget Sound; Mr. Gibbs.

"Oysters are rare on most parts of the northwest coast, but there are a few localities in which they are found in abundance. One of these is Shoalwater bay, a little to the north of the mouth of Columbia river, where are to be found the conditions requisite for their existence and multiplication. The markets of San Francisco and all the coast southward are supplied from this bay. The oysters obtained here appear to differ little, if at all, from the common oyster of Europe, and possess the same peculiar coppery flavor remarked in the European mollusc when eaten for the first time.

In Puget Sound small oysters are found near the mouth of the Nisqually river and some others, but nowhere large enough to be of much value. They are said to grow larger at Vancouver Island, and very large ones have lately been discovered near the mouth of Hoods' Canal."—C.

ANOMIA MACHROSCHISMA.

Anomia macroschisma, DESH. Rev. Zool. 369. Mag. Zool. Pl. 34.—MIDD. Beit. iii, 6. Idem Reise, p. 242, Pl. XIX. fig. 1—5.

Placunanomia macroschisma, CARPENTER, Rep. p. 312.

Hab.—Straits of Juan de Fuca; G. Gibbs, esq. Nootka Sound; C. J. W. Russell.

Several very perfect specimens were collected at the Straits of Fuca, and sent to the Smithsonian Institution by Mr. Gibbs.

PECTEN CAURINUS.

Pecten caurinus, GOULD Proceed. Bost. Soc. iii, p. 345. Exped. Shells. 95. U. S. Exploring Exped. Moll. & Shells, p. 458. Atlas, fig. 569. CARPENTER, Rep. p. 311.

Hab.—Straits of Fuca; Dr. Suckley. G. Gibbs, esq. Port Townsend, Admiralty inlet, Oregon; Gould.

This fine pecten is found of a much larger size than that described by Dr. Gould. Of ten specimens collected by Mr. Gibbs, and sent to the Smithsonian Institution, one measures twenty three inches in circumference, with a diameter of nearly eight inches, and some others are nearly as large.

PECTEN VENTRICOSUS.

Pecten ventricosus, SOWB. Thes. No. 19, pl. 12, f. 18, 19, 26.

Pecten tumidus, SOWB. (von Tuet. seec. Zeiten) Proc. Zool. Soc. London, p. 109, 1852?

Hab.—Upper California; Dr. Trask. San Diego; Mr. Cassidy.

Family MYTILIDÆ.

MYTILUS EDULIS.

Mytilus edulis, LINN., LAM, GOULD, MIDD., CARPENTER.

Hab.—Shoalwater bay; Dr. Cooper.

“The common mussel of Europe and our own eastern coasts is found in Shoalwater bay in equal abundance, and presenting the same variations in color and markings as there. It is also common in the estuaries along the whole coast, and to the head of Puget Sound. They are eaten by the Indians, but less used than the large clams so abundant in the same places. I have also seen a very severe case of *urticaria* caused by eating them, probably from swallowing the beard. The same effect is sometimes observed in Europe and the United States.”—C.

MYTILUS CALIFORNIANUS.

Mytilus californianus, CONR. Journ. Acad. Philad. VII, p. 242, pl. 18, f. 15.—CARPENTER, Rep. p. 309.

Hab.—Puget Sound, Port Townsend; Dr. Suckley, Mr. Gibbs. Upper California; Dr. Trask.

This shell ranges from California, northward, to the Straits of Fuca, and numerous specimens have been collected and sent to the Smithsonian Institution from various localities along the coast. Among them are some of all the various sizes, up to nine and a quarter inches long, but all exhibiting the peculiar marks described by Mr. Conrad. These characters are less obvious on the old and overgrown individuals, as might be expected, but, according to my observations, can always be traced.

MODIOLA CAPAX.

Modiola capax, CONRAD, Journ. Acad. Philad. VII, p. 242.—GOULD, CARPENTER, Rep. p. 309.

Hab.—Straits of Fuca; Mr. Gibbs, Dr. Cooper.

“Not a common species in this locality.”—C.

MODIOLA FLABELLATA.

Modiola flabellata, GOULD, U. S. Expl. Exped. Moll. & Shells, p. 453, fig. 561.—IB. Proc. Bost. Soc. III, 343.

Hab.—Straits of Fuca and Puget Sound; G. Gibbs, esq.

This is a much larger and very different shell from *M. brasiliensis*, so common at Panama, with which Mr. Carpenter supposes it to be synonymous.—(Vid. Carp. Report, p. 210.)

LITHODOMUS.

A fine large species, unlike any described from this region, though approaching in some particulars *S. falcatus*, GOULD, was found in rocks near the mouth of the Umpqua river, Oregon, by Dr. Vollum, U. S. A., and sent to the Smithsonian Institution.

Family ARCADEÆ.

ARCA GRANDIS.

Arca grandis, BROD. & SOWERBY; REEVE, C. I., pl. —, f. 4.—CARPENTER, Report, p. 310.

Hab.—San Diego; Mr. Cassidy.

A fine specimen of this remarkable *Arca*, preserved entire in alcohol, was sent to the Smithsonian Institution from San Diego by Mr. Cassidy, being the first instance in which it has occurred beyond the limits of the Panama province.

Family UNIONIDÆ.

MARGARITANA MARGARITIFERA.

Margaritana margaritifera, LEA, in Philad. Trans.

Mya margaritifera, LINN.

Margaritana fluviatilis, SCHUMACHER.

Alasmodonta falcata, GOULD, in Proc. Bost. Soc., N. H., III, p. 294.—IDEM, U. S. Exploring Ex., Mollus. & Sh., pp. 433, 434—CARP. Report, p. 309.

Hab.—Chehalis and other rivers of Washington Territory, Dr. Cooper. Shasta river, Oregon, Dr. Trask.

After a careful comparison of specimens from the above localities with others from the Atlantic States, as well as from Newfoundland and Europe, we are brought to the same conclusion as Mr. Lea, namely, that the northwestern shell is at most a slight variety of the well known *M. margaritifera* of Linnæus.

"This is the most abundant of the fresh water bivalves, and the only one I have been able to find in the Chehalis, the streams emptying into Puget Sound, and most branches of the Columbia. No species is found in the streams running into Shoalwater bay. The Indians east of the Cascade mountains eat these, food of any kind being acceptable to most of them."—C.

ANODONTA ANGULATA.

Anodonta angulata, LEA, in Philos. Trans.

Anodonta feminalis, GOULD, U. S. Expl. Exped. Moll. and Shells, 436.—CARP. Rep., p. 309.

Hab.—Yakima river, Washington Territory, Dr. Cooper. Walla-Walla river, Oregon, Dr. Pickering.

Several perfect specimens of various ages were brought by Dr. Cooper from the above locality, where it appears to be plentiful.

ANODONTA OREGONENSIS.

Anodonta oregonensis, LEA, Philos. Trans.; pl. xxi, f. 67.—CARPENTER, Rep., p. 309.

Hab.—Rivers of Washington Territory; Dr. Cooper.

ANODONTA WAHLAMATENSIS.

Anodonta wahlamatensis, LEA, in Philos. Trans.; pl. xx, f. 64.—CARP. Rep., p. 309.

Hab.—Lagoons, Sacramento, Dr. Trask. Wahlamet river, Nuttall.

The Californian specimens sent by Dr. Trask are larger and finer than those from the more northern habitats.

Family CARDIADAE.

CARDIUM NUTTALLI.

Cardium Nuttalli, CONR. Jour. Acad. Phila. VII, p. 229; pl. 17, f. 3.—MIDDEND. Beitrage, III, p. 39; pl. xvi, f. 1-5.
CARP. Rep., p. 307.

Hab.—Shoalwater bay and Puget Sound; Dr. Cooper. San Francisco; Dr. Bigelow, Dr. Trask.

"This large shell is the most abundant of the clams in Shoalwater bay, and is very much used as food. It inhabits a mixture of sand and mud, a few inches from the surface, in all parts of the bay about half way between the shores and the large channels. The Indians are very expert in finding them, getting numbers where a stranger can see no sign of their existence, by feeling for them with a knife or flat stick. In July many come to the surface and die, perhaps from the heat of the sun."—C.

CARDIUM QUADRAGENARIUM.

Cardium quadragenarium, CONR. Jour. Acad. Phila. VII, p. 230; pl. 17, f. 5.—CARP. Rep. p. 307

Hab.—San Luis Obispo; Dr. Antisell, U. S. A.

A valve of this rare species was obtained by Dr. Antisell at the above locality.

Family LUCINIDAE.

LUCINA CALIFORNICA.

Lucina californica, CONRAD, Jour. Acad. Phila. VIII, p. 255, pl. 20, fig. 1.—CARPENT. Rep. p. 307.

Hab.—San Diego; Mr. Cassidy.

Family CYCLADIDAE.

CYCLAS, n. s. ?

Dr. Gould enumerates two species of this genus from Oregon, *C. patella* and *C. egregia*. Not having met with any description, we are unable to determine whether either of them is identical with our's or not, or whether it may not be the same as one of our eastern species.

Hab.—Whidby's island, Straits of Fuca; Dr. Cooper. Pools near Steilacoom; Dr. Cooper.

Family VENERIDAE.

VENUS STAMINEA.

Venus staminea, CONR. Jour. Acad. Phila. VII, p. 250, pl. 19, fig. 14, 1837.

Venerupis petilii, DESH. Rev. Zool. p. 359, 1839.—IDEM. Mag. de Zool. pl. 39, 1841.—MIDD. Beit. III, 51, pl. XVII, fig 15-13.

Venus rigida, GOULD, Proceed. Bost. Soc. N. H. III, p. 227, 1850.—IDEM. U. S. Exploring Exped. Moll. and Shells, p. 420; Atlas, fig. 538.

Tapes diversa, SOWB. Thes. pl. 146, fig. 41. No. 65.—CARP. Rep. p. 306.

Tapes straminae, CARPENTER, Rep. p. 196.

Saxidomus pelatii, IDEM. Rep. p. 299.

Hab.—Shoalwater bay and Puget Sound; Dr. Cooper and Dr. Suckley. San Francisco; Dr. Trask. San Diego; Lieut. Trowbridge.

We have brought together the above synonymy after repeated examination and comparison of specimens from distant localities between the Straits of Fuca and San Diego. The northern shells are commonly but not invariably "ashy white," as described by Dr. Gould, some

exhibiting brown zig-zag marks, after the manner of the young *Venus mercenaria* (*V. notata*, Say.) Others from San Francisco, where they are sold in the markets as food, sometimes exhibit brown undulating cross lines, at others broad longitudinal bands. In size and outline they vary more or less, but in the characters of the teeth and hinge there is no material difference.

"*T. Straminea*, CONRAD?" of Sowerby, Thes. 72, fig. 151, is a different shell, which I have received from Panama, and consider it a variety of *V. histrionica*. Conrad has not used the name *straminea*. His name *staminea* is dropped by Carpenter in his general catalogue, *straminea* only being quoted.—(See Rep. 306.)

SAXIDOMUS NUTTALLI.

Saxidomus Nuttalli, CONR. Jour. Acad. Phila. VII, p. 249, pl. 19, fig. 13, 1837.

Venerupis gigantea, DESH. Rev. Zool. p. 359, 1839.—IDEM, Mag. de Zool.; pl. 43, (fossil?) 1841.—MIDDEN. Beit. III, p. 52, pl. xviii, f. 1-3.

Venus maxima, PHILIPPI, Abbild. II, t. 6, f. 1. 1846. Sowb. Thes., 46, f. 127.

Saxidomus gigantea, and *S. Nuttalli*, CARP. Rep. p. 299.

Hab.—Shoalwater bay and Puget Sound, Dr. Cooper; Bodega, California, Dr. Trask; Sitka, Middendorff; Kamschatka, Pot. & Mich., (Middendorff.)

"This, which somewhat resembles the *quahog* of the Atlantic coast, and is called by that name, is, however, much superior to it as food. It is found in the south part of Shoalwater bay *only*, and near the mouth of the Copalux. I have found it, also, common in Puget Sound. Its station is in somewhat hard sand, near low-water mark."—C.

There is also a variety of this shell found fossil in coast banks elevated ten feet above the sea level, which is very correctly represented in Deshayes' plate. The circumstance mentioned by Deshayes, of the encroachment of the ligament, destroying the teeth, is frequently observable, even in young shells. This species varies much in different localities, but chiefly in the exterior marking of the shell, the disk being sometimes brown, with rough concentric striæ, as described by Conrad; others, from Oregon, are much smoother, without regular striæ. But the most aberrant appearance is found in another variety that occurs fossil at Shoalwater bay, where it was collected by Dr. Cooper. This is well figured in Middendorff's work, as above cited, and less distinctly appears in Deshayes' figure. The specimen described by the latter (from California) appears to be fossil, as he suspected. Middendorff gives no such intimation regarding his.

A specimen from California measures 4.8 inches in breadth. A somewhat large, and very perfect specimen is most accurately figured and described by Anton, in the work of Philippi, above quoted, whence it is also copied by Sowerby.

VENUS CAMELLIFERA.

Venus camellifera, CONR. Jour. Acad. Phila. VII, p. 251, pl. 19, f. 19. 1837.

Venerupis cordieri, var. β DESH. Cat. Varn. p. 191, No. 1.

Petricola cordieri, DESH. Rev. Cuv. p. 358. 1839.

Rupellaria camellifera, CARP. Rep. p. 299.

Hab.—San Diego; Mr. Cassidy.

Several entire specimens, but none smooth, and one with perfect camellæ, were sent by Mr. Cassidy to the Smithsonian Institution.

Family MACTRIDÆ.

LUTRARIA MAXIMA.

Lutraria maxima, MIDDENDORFF, Beit. III, p. 66, pl. xix, f. 1-4. 1849.

Lutraria capax, GOULD, Proceed. Bost. Soc. N. H. III, p. 217. 1850.

Lutraria maxima, IDEM, U. S. Expl. Exped. Moll. and Shells, p. 395. Carp. Rep. p. 300.

Hab.—Shoalwater bay, Dr. Cooper; San Francisco, California, Dr. Trask; Sitka, Middendorff, (from Wosnessenskii.)

"This great *clam* (as all these edible bivalves are indiscriminately called) is found in Shoalwater bay, within a rather limited area near the mouth and along the larger channels. It is buried near two feet deep in hard sand, near low water mark, its long siphon reaching the surface and showing where it can be found. It also abounds in many parts of Puget Sound, up to near Olympia. It is excellent as food, and has always been one of the chief articles of winter stores to the Indians, who preserve the hard parts by stringing and then smoking them in their lodges. It attains to $7\frac{5}{8}$ inches in breadth, and is very capacious.

Portions of the clay and sandstone cliffs surrounding the bay are perforated by the burrows of this animal at a height of ten feet above the present high water. All the other mollusca inhabiting the bay now are also found in these fossil beds; and two which are not found now were then common. There is no tradition among the Indians of the time of their elevation, and the ancient trees standing on the surface show no signs of the irregular upheavings which raised the former levels of low water, by successive stages, to a height now nearly one hundred feet above the sea."—C.

Family TELLINIDÆ.

TELLINA NASUTA.

Tellina nasuta, CONR. Journ. Acad. Phila. VII, p. 258.—MIDD. Beitrage, III, p. 61, 62.—IDEM, Reise, p. 256, pl. xxiii, f. 6-11.—SOWB. Thes. VI, p. 314, pl. 64, f. 224.—CARP. Rep. p. 302.

Hab.—Shoalwater bay, Dr. Cooper; Puget Sound, Dr. Suckley; San Francisco, Dr. Trask.

Rather a common species, whose range extends from Lower California to the Arctic regions, having been found by Eschscholtz at Sitka, and by Middendorff in the Sea of Okhotsk.

TELLINA EDENTULA.

Tellina edentula, BROD. & SOWB. Zool. Journ. IV, p. 363.—GRAY, Zool. of Beechey's Voy. p. 154, pl. 41, f. 5, and pl. 44, f. 7.—CARP. Rep. p. 301.

Hab.—Puget Sound, G. Gibbs; Oregon, Nuttall.

Several specimens of this large species were sent to the Smithsonian Institution by Mr. Gibbs. It was also found at the mouth of Columbia river by Mr. Nuttall. In old shells the teeth nearly disappear, but in younger examples they are long and strong, so that the name is not strictly applicable.

TELLINA BODEGENSIS.

Tellina bodegensis, HINDS, Zool. Voy. Sulph. p. 67, pl. 21, f. 2.—CARP. Rep. p. 302.

Hab.—Shoalwater bay, Dr. Cooper; mouth of the Umpqua river, Dr. Vollum, U. S. A.

This is much more rare than *T. nasuta* found in the same stations.

SANGUINOLARIA CALIFORNIANA.

Sanguinolaria californiana, CONR. Jour. Acad. Phila. VII, p. 230, pl. 17, f. 6, CARP. Rep. p. 301.

Hab.—Mouth of Columbia river; Dr. Cooper.

Rather common at the mouth of the Columbia and other rivers, and high up salt water creeks.—C.

Family SOLENIDÆ.

SOLEN SICARIUS.

Solen sicarius, GOULD, Proceed. Bost. Soc. N. H. III, p. 214.—IDEM, U. S. Expl. Exp. p. 387, atlas, fig. 501.—CARPENT. Rep. p. 301.

Hab.—Puget Sound; Dr. Cooper.

A single dead shell found on the shore at the town of Steilacoom. It is probably abundant on the mud flats near the mouth of the Nisqually river.—C.

MACHAERA NUTTALLI.

Solen maximus, WOOD, (nec Chemn.) Gen. Con. pl. 31, f. 3.—IDEM, Ind. Test. pl. 3, f. 16.

Solecurtus nuttalli, CONR. Journ. Acad. Phila. VII, p. 234, pl. 17, f. 9.

Machaera costata, MIDD. (nec Say) Beit. III, p. 78, pl. XXI, figs. 4–10.—IDEM, Reise.

Machaera maxima, GOULD, U. S. Expl. Exped.; Jay's Cat. No. 239.

Machaera nuttalli, CARPENTER, Rep. p. 301.

Hab.—Seacoast of Washington Territory; Dr. Cooper.

This shell inhabits the sand immediately upon the sea-beach, burrowing about the edge of the usual low tide, where it can be dug up with little trouble, as it is only a few inches from the surface. It is considered, and justly, the best of the many fine eatable mollusca of the coast, excepting always the oyster. Severe storms wash up many of these shells, but they soon crack under the sun's rays, and the beautiful epidermis falls off.

This is the only truly marine mollusc I have been able to find on the sandy sea-beach near the Columbia river. It extends northward as far as the beach is sandy, but is not found, I believe, anywhere within the Straits of De Fuca.—C.

Family MYACIDÆ.

MYA CANCELLATA.

Mya cancellata, CONR. Journ. Acad. Phila. VII, p. 235, pl. 18, f. 2.—JAY Cat. No. 265.

Platyodon cancellatum, CONR. Journ. Acad. Phila. 1849.—CARP. Rep. p. 300.

Hab.—San Luis Obispo; Dr. Antisell.

Dead valves only were found.

SPHOENIA CALIFORNICA.

Sphoenia californica, CONR. Journ. Acad. Phil. VII, p. 234, pl. 17, f. 11.—CARP. Rep. p. 300.

Cryptomya californica, CONR. Journ. Acad. Phila. 1849, p. 208.

Hab.—San Francisco; Dr. Trask.

Family ANATINIDÆ.

MYTILIMERIA NUTTALLI.

Mytilimeria nuttalli, CONR. Journ. Acad. Phila. VII, p. 247. pl. 19, f. 5.—CARP. Rep. p. 301.

Hab.—San Diego; Lieutenant W. P. Trowbridge.

A small group of this curious shell, nestling in a white friable arenaceous substance, was received by the Smithsonian Institution through the kindness of Lieutenant Trowbridge.

Family PHOLADIDÆ.

PHOLAS PENITA.

Pholas penita, CONR. Jour. Acad. Phila. VII, p. 237, pl. 18, f. 7, 1837.

Pholus concamerata, DESHAYES, Rev. Zool. p. 234, 1839.—IDEM, Mag. de Zool. pl. 17, 1840.

Parapholas penita, CONR. Jour. Acad. Phila. 1849, p. 214, CARP. Rep. p. 290.

Hab.—Shoalwater bay, Dr. Cooper; Straits of Fuca, Dr. Suckley; Oregon, mouth of Umpqua river, Dr. Vollum, U. S. A.

“A specimen was obtained from a piece of worn rock which drifted into the bay attached to the roots of *macrocystis*, the giant seaweed.”—C.

No. 7.

REPORT ON THE CRUSTACEA COLLECTED ON THE SURVEY.

By J. G. COOPER, M. D.

CLASS CRUSTACEA.

Order DECAPODA BRACHYURA.—Short-tailed Crustaceans.

CANCER MAGISTER, Dana.

The Great Western Crab.

Cancer magister, DANA, U. S. Expl. Exped., Crust., 151, pl. vii, fig. 1.—STIMPSON, Proc. Cal. Acad. Nat. Sc. I, 88.—IBID. Journ. Bost. Soc. Nat. Hist. VI, 1857, (extracted, p. 18.)

Cancer inoratus, RANDALL, Proc. Cal. Acad. Nat. Sc. (non Say.)

SP. CH.—The largest crab of our Pacific coast; antero-lateral margin ten-toothed; teeth anteriorly but little prominent. Third article of outer maxillipeds somewhat granulated, with the exterior apex broadly truncated. Feet of second pair longest, as long as the width of carapax. Length when full grown, nearly five inches; width nearly nine. Color, light reddish brown above, darkest anteriorly, often light orange below; inner sides of anterior feet and hands, crimson.

This large crab is very abundant at Shoalwater bay during spring and summer. They can be taken by hand in large numbers at low tide on the sand flats or in shallow pools. Their spawn is deposited in July, after which they leave the bays for deep water. As food they are superior to the common crab of the Atlantic coast, (*Lupa dicantha*.)

PINNIXA FABIA, Stimpson.

The Parasitic Lutraria Crab.

Pinnothera faba, DANA, U. S. Expl. Exped. Crust. I, 381, pl. xxiv, fig. 4.

Pinnixa faba, STIMP. Journ. Bost. Soc. Nat. Hist. VI, (extracted, p. 30.)

SP. CH.—The male resembles *P. cylindrica*, (*Pinnothera cylindrica*, Say,) and is much smaller than the female, while the carapax is shorter and broader, its length being in the proportion of 1 to 1.8. Length, 0.36 inch; breadth, 0.65. Female, length, 0.69 inch; breadth, 1.05. Hands very large, finger more curved in the male than the female. Color, (living,) grayish white.

This little crab is found within the large shell of the *Lutraria*, one of the "Clams" abundant at Shoalwater bay, but I never met with more than half a dozen in hundreds of shells. It probably lives on food brought into the shell by the current of water, and does not at all incommode its hospitable host. I never met with it in other shells.

Order DECAPODA MACROURA.—Long-tailed Crustaceans.

CALLIANASSA CALIFORNIENSIS, Dana.

Small Land Crawfish.

Callianassa Californiensis, DANA, Proc. Acad. Nat. Sc. Phil., 1854, VII, p. 175.

Callianassa occidentalis, ST. Proc. Cal. Acad. Nat. Sc. I, 1855, 88.

SP. CH.—Eye peduncles sub-triangular, closely approximated at their bases, but diverging at their pointed tips. Length of external antennæ two-thirds that of the body. Larger anterior foot smooth and glossy on the sides, ciliate along the edges. Hand broadest at the base, but little longer than the carpus and much narrower. Color a delicate orange; anterior feet rose-colored. Length, three inches.

This animal lives in the hard sand about the mouth of Shoalwater bay, buried at the depth of about a foot, and leaving a small hole at the surface, sometimes visible at low tide. It may readily be known by its soft body and general form, resembling that of the crawfish. Two other species, one of them often five inches long, are found in similar situations on the coast.

ASTACUS TROWBRIDGII, Stimpson.

Coast Crawfish.

Astacus trowbridgii, ST. Proc. Bost. Soc. Nat. Hist. VI, p. 87.—IBID. Journ. Bost. Soc. Nat. Hist. VI, (extracted, p. 83,) pl. xxi, fig. 4.

SP. CH.—Thoracic spines prominent, rostrum short, broad, with smooth nearly parallel sides; terminal tooth of moderate length; antero-lateral teeth sufficiently prominent. Hands large, robust, equal in size; surface rough; fingers spinulose. A prominent spine near the extremity of the brachium. Color, when fresh, olive above; pale, tinted with red below. Length, four to five inches.

Numerous species of crawfish are found in the Territory, nearly all so closely allied as to be distinguished only on careful comparison. One found in the Columbia is said to grow eight inches long.

This species is found in the streams running into Shoalwater bay, and also at the mouth of the Columbia. It sometimes gets into the brackish water of the bay, but probably returns to the fresh streams as soon as possible. All the crawfish are good eating, but small usually, and not much sought after.

CRANGON FRANCISCORUM, Stimpson.

San Francisco Shrimp.

Crangon franciscorum, ST. Proc. Cal. Acad. Nat. Sc. I, 1856, p. 89.—IBID. Journ. Bost. Soc. Nat. Hist. VI, (extracted, p. 55,) plate xxii, fig. 5, (hand.)

SP. CH.—Very slender and depressed; rostrum small, subtriangular, rounded in front; hand large, with an oblique palm, thumb-like process long and spiniform. Color, light and dark yellowish gray, mottled; eyes salmon red in life. Length, from one to three inches.

This is the only species of shrimp I found at Shoalwater bay, where it is very rare, since I got only three or four, and these only half the size it grows to further south. In San Francisco great numbers of this and a black-tailed species (*C. nigricauda*, St.) are sold as food in the markets. Those I found were caught in September.

Order ISOPODA, Equal-footed Crustaceans.

IDOTAEA WOSSNESSENSKII, Brandt.

Dark-green Idotaea.

Idotaea Wosnessenskio, BRANDT, Sibirische Reise, Zool. I, p. 146.—STIMPSON, Journ. Boston Soc. N. H. VI, (64.)

I. hirtipes, DANA, U. S. Expl. Exped. Crust. II, p. 704, pl. XLVI, fig. 6.

I. oregonensis, DANA, Proc. Acad. N. S. Phil. 1854, VII, p. 175.

A very common animal, about an inch in length, and of a dark green color, in form resembling the common "saw-bugs." Found on sea-weed among rocks, between high water and low tide marks, Shoalwater bay.

SPHAEROMA OREGONENSIS, Dana.

Oregon Water Pill-bug.

Sphaeroma oregonensis, DANA, U. S. Expl. Exped. Crust. II, 778; pl. LII, fig. 4. Ib. Proc. Acad. N. S. Philad., VII p. 177.—STIMPSON, Journ. Bost. Soc. N. H. VI, (69.)

A common species found under stones at low-water mark in bays, &c. It looks very much like the pill-bug or saw-bug of the land, (*Oniscus*), and like it rolls itself into a ball when disturbed.

Numerous other crustacea are found on the coast of the Territory, but none of them fell under my observation. For a complete enumeration of them, with synonymy and description of new species, the reader is referred to Stimpson's article in Journ. Bost. Acad., vol. VI.

LIST OF CRUSTACEA OBTAINED AT PUGET SOUND BY DR. SUCKLEY.

Descriptions of the species are contained in the Report on the Crustacea and Echinodermata of the Pacific shores of North America, by William Stimpson, extracted from the Proceedings of the Boston Society of Natural History.

Cancer magister, Dana.

Cancer gracilis, Dana.

Pseudograpsus oregonensis, Dana.

Paguristes turgidus, Stimpson.

Callianassa californiensis, Dana.

Callianassa longimana, Stimpson.

Astacus leniusculus, Dana.

Crangon franciscorum, Stimpson.

Pandalus danae, Stimpson.

Idotaea resecata, Stimpson.

Lygia dilatata, Stimpson.

Orchestia californiensis, Dana.

} Obtained by Captain Murden.

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APPENDIX A—Continued.

No. corresponding to profile.	Locality.	Date.	Hour.	Distance between stations.	Barometer reading, (No. 1006.)	Attached thermometer.	Temperature of the air.	Mean corrected barometer.	Altitude.	Remarks.
				Miles.	Inches.	°	°	Inches.	Feet.	
15	Thirty-four miles below the Council Ground.	1855. Nov. 15	Sunset	25.11	27.058	34	32	.....	.....	
		16	Sunrise.....	.....	26.888	29	29	.....	.....	
		16	.....	.....	.....	.....	30½	26.990	2,903.7	
16	Camp 52 miles below the Council Ground	16	Sunset	17.58	27.176	44	43	.....	.....	
		17	Sunrise.....	.....	27.300	34	34	.....	.....	
		17	.....	.....	.....	.....	38½	27.236	2,691.8	
17	Left bank of Bitter Root river, sixty poles below camp of 3d and 4th July.	17	Sunset	14.46	27.410	40	40	.....	.....	
		18	Sunrise.....	.....	27.378	34	33	.....	.....	
		18	.....	.....	.....	.....	36½	27.392	2,530.5	
18	St. Regis Borgia river.	18	Sunset	15.45	26.818	40	40	.....	.....	
		19	Sunrise.....	.....	26.996	35	35	.....	.....	
		19	.....	.....	.....	.....	37½	26.908	3,019.8	
19	Up river at 19th crossing.	19	Sunset	10.63	26.812	34	34	.....	.....	
		20	Sunrise.....	.....	26.846	22	21	.....	.....	
		20	.....	.....	.....	.....	27½	26.853	3,042.8	
20	West foot of Divide, up crossing of stream	20	Sunset	13.28	26.490	38	35	.....	.....	
		21	Sunrise.. ..	.....	26.330	28	28	.....	.....	
		21	.....	.....	.....	.....	31½	26.420	3,573.7	
	Crossing right bank	21	½ past sunrise. ....	.....	26.340	28	28	26.332	3,617.2	
	Up stream, at the forks.	21	9 a. m.	0.24	26.300	28	28	26.323	3,621.3	
	Up stream.	21	9.32 a. m.	0.48	26.270	32	28	26.265	3,687.0	
	Up stream, left bank.	21	10.30 a. m.	0.48	26.234	37	35	26.227	3,752.9	
	Do.....	21	11.22 a. m.	0.96	26.104	32	31	26.114	3,854.0	
	Summit of Divide.....	21	11.50 a. m.	0.24	26.064	31	31	26.090	3,877.7	
21	7.16 miles from summit of Divide.....	21	Sunset	7.16	.....	.....	.....	.....	.....	
		22	Sunset .....	.....	26.600	32	32	.....	.....	
		23	Sunrise.....	.....	26.414	24	23	.....	.....	
		23	.....	.....	.....	.....	27½	26.531	3,367.9	
22	Camp 21.36 miles from summit.....	23	Sunset	14.2	27.250	29	28	.....	.....	
		24	Sunrise.....	.....	27.328	30	30	.....	.....	
		24	.....	.....	.....	.....	29	27.309	2,592.2	
23	Camp 44.46 miles from summit.....	24	Sunset	12.8	27.732	33	33	.....	.....	
		25	Sunrise.....	.....	27.922	32	32	.....	.....	
		25	.....	.....	.....	.....	32½	27.840	2,079.4	
24	Camp at Cœur d'Alene Mission.	25	Sunset	11.63	28.112	33	34	.....	.....	
		26	Sunrise.....	.....	28.124	27	27	.....	.....	
		26	2 p. m. ....	.....	28.174	41	41	.....	.....	
		26	Sunset .....	.....	28.176	41	42	.....	.....	
		27	Sunrise.....	.....	28.112	27	27	.....	.....	
		27	.....	.....	.....	.....	34½	28.155	1,776.8	
25	Camp towards Wolf's Lodge, 16 miles from Cœur d'Alene Mission.	27	Sunset	16.0	27.964	35	33	.....	.....	
		28	Sunrise.....	.....	27.616	21	19	.....	.....	Snowing slightly.
		28	.....	.....	.....	.....	26	27.814	2,090.2	
26	Outlet of Cœur d'Alene lake.....	28	11.50 a. m.	10.0	27.676	37	35	27.682	2,240.0	
27	House of Antoine Plante.....	28	7 p. m.	18.0	.....	.....	.....	.....	.....	
		29	Sunrise.....	.....	27.940	31	31	27.912	2,006.0	
28	One-quarter mile from A. Plante's house, towards the river.	29	Sunset	0.25	27.876	34	33	.....	.....	
		30	Sunrise.....	.....	27.592	42	40	.....	.....	
		Dec. 1	Sunrise.....	.....	28.134	30	30	.....	.....	
		1	Sunset .....	.....	28.168	35	33	.....	.....	
		2	Sunrise.....	.....	27.968	28	27	.....	.....	
		2	Sunset .....	.....	27.994	33	33	.....	.....	

HEIGHTS AND DISTANCES
APPENDIX A—Continued.

No. corresponding to profile.	Locality.	Date.	Hour.	Distance between stations.	Barometer reading, (No. 1006.)	Attached thermometer.	Temperature of the air.	Mean corrected barometer.	Altitude.	Remarks.
				Miles.	Inches.	°	°	Inches.	Feet.	
28	One quarter mile from A. Plante's house, towards the river.	1855. Dec. 3	Sunrise		27.936	35	33			
			4 Sunrise		27.806	33	33			
			5 Sunrise		27.818	27	25			
			5 Sunset		27.724	35	33			
			6 Sunrise		27.728	20	18			
			6				30.7	27.829	2,024.8	
			6 Sunset	1.0	27.770	36	34			Two inches of snow fell last night.
29	Up Cœur d'Alene river, left bank, 1.25 mile from Antoine Plante's.		7 Sunrise		27.714	33	31			
			7				32½	27.759	2,168.3	
			7 Sunset	4.0	27.384	26	24			
30	Up river, one mile from lake		8 Sunrise		27.492	31	31			
			8				27½	27.435	2,465.1	
			8 Sunset	25.0	27.346	31	30			
31	Camp on Kamas or Nidl-hudlk creek		9 Sunrise		27.384	36	33			
			9				31½	27.376	2,532.9	
			9 Sunset	25.0	27.028	39	37			
32	Kamas prairie		10 Sunrise		27.090	39	36			
			10				36½	27.056	2,866.9	
			10 Sunset	28.0						
33	Fifteen miles south of Pelouse river		11 Sunrise		27.186	33	32			
			11 Sunset	25.0						
34	Lapwai, at Mr. W. Craig's		12 Sunrise		28.882	36	34			
			12 2 p. m.		28.846	40	38			
			12 Sunset		28.856	37	37			
			13 Sunrise		28.700	30	29			
			13 2 p. m.		28.570	37	35			
			13 Sunset		28.536	36	35			
			14 Sunrise		28.586	34	33			
			14				34.4	28.716	1,240.5	
			14 Sunset	4.0	28.754	36	34			
35	Down Lapwai, at forks of stream		15 Sunrise		28.664	29	27			Snow.
			15				30½	28.721	1,234.5	
			15 Sunset	12.0	29.288	34	32			
36	Fork of Clearwater and Snake rivers		16 Sunrise		29.462	29	29			
			16				30½	29.385	612.1	
			16 Sunset	14.0	28.854	32	31			
37	Al-pa-ho creek, five miles from its mouth.		17 Sunrise		28.618	34	32			Two inches of snow during the night.
			17				31½	28.748	1,207.0	
			17 Sunset	20.5	28.434	41	40			
38	In cañon, half mile up from the trail		18 Sunrise		28.464	41	40			
			18				40	28.440	1,512.7	
			18 Sunset	13.0	27.958	46	46			
39	Touchet river, at fork		19 Sunrise		27.878	44	42			
			19				44	27.900	2,045.9	
			19 Sunset	18.5	28.086	47	45			
40	Dry creek, half mile above trail		20 Sunrise		28.410	37	35			
			20				40	28.237	1,708.6	
			20 Sunset	14.0	29.110	42	41			
41	Walla-walla river, right bank, opposite to the Mission.		21 Sunrise		28.744	39	38			
			21 2 p. m.		28.914	39	37			
			21 Sunset		28.906	32	32			
			22 Sunrise		29.536	2	2			
			22 2 p. m.		29.636	12	9			

HEIGHTS AND DISTANCES.

11

APPENDIX A—Continued.

No. corresponding to profile.	Locality.	Date.	Hour.	Distance between stations.	Barometer reading, (No. 1006.)	Attached thermometer.	Temperature of the air.	Mean corrected barometer.	Altitude.	Remarks.
		1855.		Miles.	Inches.	°	°	Inches.	Feet.	
41	Walla-walla river, right bank, opposite to the Mission.	Dec. 22	Sunset .....	.....	.....	.....	.....	.....	.....	
		23	Sunrise .....	.....	.....	.....	.....	.....	.....	
		23	2 p. m. ....	.....	29.772	11	7	.....	.....	
		23	Sunset .....	.....	29.762	2	-3	.....	.....	
		24	Sunrise .....	.....	29.768	2	-17	.....	.....	
		24	.....	.....	.....	.....	+16.2	29.411	579.3	
42	Tamallamp creek	24	Sunset	4.0	29.500	6	2	.....	.....	
		25	Sunrise .....	.....	29.540	6	-15	.....	.....	
		25	2 p. m. ....	.....	29.550	6	1	.....	.....	
		25	Sunset .....	.....	29.492	.....	-14	.....	.....	
		26	Sunrise .....	.....	29.286	.....	-13	.....	.....	
		26	2 p. m. ....	.....	29.216	-1	-3	.....	.....	
		26	Sunset .....	.....	29.150	-5	-5	.....	.....	
		27	Sunrise ..	.....	29.079	-2	+1	.....	.....	
		27	2 p. m. ....	.....	29.138	10	7	.....	.....	Snowing.
		27	Sunset .....	.....	29.156	5	4	.....	.....	
		28	Sunrise .....	.....	29.550	1	0	.....	.....	
		28	2 p. m. ....	.....	29.660	21	16	.....	.....	
		28	Sunset .....	.....	29.636	3	1	.....	.....	
		29	Sunrise .....	.....	29.766	3	3	.....	.....	
		29	2 p. m. ....	.....	29.758	20	9	.....	.....	
		29	Sunset .....	.....	29.694	0	2	.....	.....	
		30	Sunrise .....	.....	29.524	.....	-11	.....	.....	
		30	2 p. m. ....	.....	29.540	16	9	.....	.....	
		30	Sunset .....	.....	29.482	0	-3	.....	.....	
		31	Sunrise .....	.....	29.390	4	2	.....	.....	
		31	2 p. m. ....	.....	29.464	20	13	.....	.....	
		31	Sunset .....	.....	29.454	10	8	.....	.....	
		1856.								
		Jan. 1	Sunrise .....	.....	29.330	12	11	.....	.....	
		1	2 p. m. ....	.....	29.294	20	15	.....	.....	
		1	Sunset .....	.....	29.300	14	12	.....	.....	
		2	Sunrise .....	.....	29.516	15	11	.....	.....	
		2	2 p. m. ....	.....	29.256	21	19	.....	.....	
		2	Sunset .....	.....	29.256	21	17	.....	.....	
		3	Sunrise .....	.....	29.228	39	38	.....	.....	
		3	2 p. m. ....	.....	29.234	41	39	.....	.....	
		3	Sunset .....	.....	29.230	39	38	.....	.....	
		4	Sunrise .....	.....	29.232	43	43	.....	.....	
		4	.....	.....	.....	.....	+12	29.460	532.3	From a mean of observ'ns.
43	Wild Horse creek	4	Sunset	12.0	28.256	41	40	.....	.....	
		5	Sunrise .....	.....	28.234	39	38	.....	.....	
		5	.....	.....	.....	.....	39	28.240	1,704.0	
44	Umatilla river, left bank	5	Sunset	15.0	28.950	41	39	.....	.....	
		6	Sunrise .....	.....	28.982	42	41	.....	.....	
		6	.....	.....	.....	.....	40	28.955	1,020.5	
45	Down Umatilla river, left bank, 6 miles above agency.	6	Sunset	18.0	29.518	41	37	.....	.....	
		7	Sunrise .....	.....	29.358	33	30	.....	.....	
		7	.....	.....	.....	.....	33½	29.418	583.2	
46	Butter creek, 6 miles above crossing of wagon road.	7	Sunset	14.0	28.970	32	30	29.018	952.0	Snowing at 3 p. m.

APPENDIX A—Continued.

Observations taken by Mr. James Doty, on a survey from Fort Benton, via Sun river and eastern base of the Rocky mountains, to Birch river, in May, 1854. No. of instrument, 776.

base of the Rocky mountains, to Birch River, the valley,										
Number of station.	Locality.	Date.	Hour.	Distance between stations.	Corrected barometer reading.	Attached thermometer.	Temperature of the air.	Mean corrected barometer and thermometer.	Altitude.	Remarks.
				Miles.	Inches.	°	°		Feet.	
1	Big Coulée	May 11	6 a. m.	11.50	27.174	39	32	27.097	.....	
		11	9½ a. m.		27.020	61	62	40°	2,863.0	
2	Great Falls	12	Sunrise	25.00	26.816	42	42	26.781	.....	
		12	9 a. m.		26.745	60	58	51°	2,979.0	
3	.....	12	12 m.		26.320	59	58	26.320	3,481.7	
4	.....	12	Sunset	16.00	26.435	53	48	.....	.....	
		13	Sunrise		26.397	40	40	26.438	.....	
		13	9 a. m.		26.481	60	63	37° .3	3,474.0	
		13	2 p. m.		26.402	65	62	26.402	3,484.0	
5	.....	13	Sunset	22.00	26.276	52	52	.....	.....	
6	.....	14	Sunrise		26.442	46	45	.....	.....	
		14	2 p. m.		26.426	65	62	.....	.....	
		15	Sunrise		26.593	34	33	26.374	.....	
		15	9 a. m.		26.521	61	58	44°	3,592.0	
		15	Sunset	20.00	26.215	48	46	.....	.....	
7	.....	16	Sunrise		26.323	39	38	26.112	.....	
		16	9 a. m.		26.304	72.5	68	40°	3,789.0	
		16	2 p. m.		25.966	74	70	25.966	4,265.2	
8	.....	16	Sunset	23.00	25.996	55	56	.....	.....	
9	.....	17	Sunrise		26.027	46	46	26.237	.....	
		17	9 a. m.		26.001	67	64	52°	3,765.7	
		17	2 p. m.		25.594	80	79	91°	4,482.9	
10	.....	17	Sunset	18.50	25.621	58	59	.....	.....	
11	Sun River valley, in the mountains; lat. of camp, 47° 32' 39".	18	Sunrise		25.252	40	40	.....	.....	
		18	2 p. m.		25.632	67	65	.....	.....	
		18	Sunset		25.628	53	52	25.478	.....	
		19	Sunrise		25.604	45	44	55°	.....	
		19	9 a. m.		25.733	60	60	.....	4,594.0	
		19	2 p. m.		25.138	65	62	72°	5,166.4	
12	.....	19	Sunset	20.50	25.349	58	58	.....	.....	
13	Teton valley, near mountains.	20	Sunrise		25.392	39	38	25.085	.....	
		20	9 a. m.		25.308	64	60	47°	4,984.0	
		20	2 p. m.		25.285	81	76	84½°	4,896.7	
14	.....	20	Sunset	20.50	25.124	59	61	.....	.....	
15	.....	21	Sunrise		25.141	61	60	25.162	.....	
		21	9 a. m.		25.137	77	76	68°	5,008.0	
		21	2 p. m.	6.00	25.267	76	74	.....	.....	
16	Birch river.	21	9 p. m.		25.777	53	53	25.523	.....	
		22	Sunrise		25.316	54	52	67°	4,602.6	

APPENDIX A—Continued.

Observations taken by ————, on a trip from Fort Benton, via Teton and Dearborn rivers, through Lewis and Clark's Pass, in September, 1854. No. of instrument, 776.

Number of station.	Locality.	Date.	Hour.	Distance between stations.	Corr'd barometer reading.	Attached thermometer.	Detached thermometer.	Mean corrected barometer.	Altitude.	Remarks.
		1854.		Miles.	Inches.	°	°	Inches.	Feet.	
1	On plain	Sept. 7	11 a. m.		27.202	58	57	27.142	2,840.8	
2	Camp Teton valley.	8	5½ a. m.		26.845	48	50	.....	.....	
		8	8 a. m.		26.833	52	53	26.792	3,202.3	
3	.....	8	2 p. m.		26.267	72	68	26.248	3,773.6	
4	Teton valley.	8	6½ p. m.		26.497	55	55	.....	.....	
		9	5½ a. m.		26.488	47	46	26.457	3,520.9	
5	.....	9	2 p. m.		26.205	76	73	26.297	3,721.7	
6	Camp	9	5 p. m.		26.205	64	64	.....	.....	
		9	6½ p. m.		26.235	55	56	.....	.....	
		10	5½ a. m.		26.390	43	42	26.323	3,694.2	
7	.....	10	12 m.		26.065	65	60	26.090	3,942.0	
8	.....	10	6½ p. m.		26.119	48	48	.....	.....	
		11	5½ a. m.		26.122	38	38	26.169	3,857.8	
9	.....	11	11 a. m.		25.692	63	56	25.743	4,315.1	
10	.....	11	2 p. m.		25.896	70	71	25.972	4,068.1	
11	.....	11	3 p. m.		25.737	65	62	25.830	4,221.1	
12	.....	11	5 p. m.		25.146	58	55	25.226	4,879.2	
13	Camp Dearborn river.	12	Sunrise		25.457	34	36	.....	.....	
		12	7 a. m.		25.429	37	37	25.494	4,585.7	
14	.....	12	8 a. m.	2	25.112	57	57	25.176	4,935.4	
15	.....	12	8½ a. m.	3	25.141	61	61	25.204	4,904.6	
16	.....	12	9 a. m.	4	25.026	62	61	25.079	5,032.5	
17	.....	12	9½ a. m.	5	25.008	60	63	25.078	5,044.2	
18	Summit of Lewis and Clark's Pass.	12	1 p. m.	13	23.664	50	48	23.716	6,536.7	
19	Valley at creek.	12	2 p. m.		24.532	54	55	24.573	5,588.2	
20	.....	12	6½ p. m.		24.955	45	45	.....	.....	
		13	7 a. m.		25.032	39	38	25.061	5,063.0	
21	.....	13	2 p. m.		25.516	64	62	25.465	4,617.4	
22	.....	13	6½ p. m.		25.610	45	44	.....	.....	
		14	5½ a. m.		25.654	30	30	25.576	4,496.3	
23	.....	14	2 p. m.		25.888	82	72	25.920	4,124.1	
24	.....	14	6½ p. m.		26.163	53	52	.....	.....	
		15	5½ a. m.		26.250	41	40	26.263	3,758.2	
25	.....	15	6½ p. m.		26.633	56	60	.....	.....	
		16	7 a. m.		26.633	50	50	26.597	3,409.7	
26	.....	16	6½ p. m.		26.612	52	52	.....	.....	
		17	7 a. m.		26.683	44	43	26.588	3,415.4	
27	.....	17	6½ p. m.		26.426	57	58	26.315	3,702.9	

No. correspond- ing to profile.	Locality.	Date.	Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.	
			7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.		
1	Camp Stevens, Walla- Walla country.	1854.														
		Oct.														
		2	26.713	26.695	26.820	47.8	63.5	56.0	2	4	0	0	W. 2...	0	Cool in the morning and evening; floating clouds.	
		3	26.821	26.635	26.607	40.5	65.5	50.0	0	0	1	0	E. 1...	0	Clear and pleasant.	
		4	26.514	26.312	26.332	37.5	69.0	52.0	0	3	0	0	W. 3...	0	Cool and pleasant; somewhat hazy.	
		5	26.571	26.344	26.350	40.5	56.0	53.5	6	8	9	9	W. 2...	0	Cloudy; rain with high wind at 10 a. m.	
		6	26.563	26.682	26.723	44.0	46.5	44.0	4	10	10	10	E. 1...	0	Rain fell last night in the valley and snow in the mountains; rain since 6 p. m.; cool.	
		7	26.763	26.775	26.732	42.0	43.0	37.0	10	10	10	0	E. 2...	W. 1...	Showery during the morning; snowing in the mountains; rain.	
		8	26.878	26.892	26.870	40.5	45.0	36.5	10	3	0	0	0	0	Cleared off at 10 a. m.; clear and cool at 9 p. m.	
		9	.....	.....	26.364	.....	.....	46.0	.....	.....	10	.....	.....	0	Raining since 6 p. m.; showery.	
		10	26.352	26.386	26.546	45.0	53.5	46.0	10	8	2	2	0	W. 2...	0	Showery; raining in the mountains to the west; clear at 9 p. m.
		11	26.509	26.580	26.577	41.0	55.0	42.5	4	5	2	0	E. 1...	0	Floating clouds during the day; clear and cool at 9 p. m.	
		12	26.628	26.633	.....	32.5	48.0	.....	0	6	.....	.....	0	NE. 1...	.....	Foggy, and heavy frost in the morning; variable.
		13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Cloudy weather; heavy frosts at night; cold during the day.
		14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		16	26.776	26.669	26.606	31.0	48.0	40.0	0	0	0	0	0	NE. 1...	0	Clear and cool; heavy frost.
		17	26.612	26.610	26.626	37.0	57.5	34.5	3	4	0	0	0	NE. 2...	0	Light fleecy clouds.
		18	26.635	26.657	26.696	39.0	50.0	38.5	7	3	0	0	E. 1...	E. 1...	E. 1...	Showery at 10 a. m.
		19	26.733	26.714	26.685	35.5	46.5	43.0	.....	1	0	0	E. 1...	E. 1...	0	Dense fog in the morning; few floating clouds during the day;
		20	26.694	26.684	26.694	36.0	53.5	39.0	.....	1	0	0	0	E. 1...	E. 1...	Foggy; clear and pleasant.
		21	26.699	.....	.....	33.0	.....	.....	10	.....	.....	.....	W. 1...	.....	.....	Clouds high.
		22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rain and snow; not very cold. Absent to visit the Pend d'Oreilles
		23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Do.
		27	26.574	26.602	26.629	42.5	47.0	36.5	7	8	0	0	W. 1...	W. 3...	0	Broken clouds; clear and cool.
		28	26.641	26.611	26.616	39.0	45.0	41.0	10	10	10	10	NE. 1...	NE. 1...	NE. 1...	Cloudy and damp in the morning; rained fast all the afternoon
		29	26.645	26.712	26.956	39.0	46.0	36.0	9	2	3	3	0	N. 1...	0	Heavy rain all night; cleared off mild and pleasant.
		30	27.123	27.128	27.158	23.0	41.5	33.0	2	1	0	0	0	W. 1...	W. 1...	Clear, cool, and pleasant.
		31	27.133	27.069	27.083	30.0	45.0	35.0	6	3	0	0	SE. 2...	NW. 1...	0	Clouds high and fleecy.
	Means.....	26.698	26.669	26.683	38.4	51.25	42.9	.....	.....	.....	.....	.....	.....	.....		
	Monthly mean..	.....	26.683	.....	.....	44.2	.....	.....	.....	.....	.....	.....	.....	.....		

METEOROLOGICAL REGISTER.

APPENDIX B—Continued.

No. correspond- ing to profile.	Locality.	Date.	Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	
1	Camp Stevens, Walla-Walla country	1854. Dec. 1	26.666	26.556	26.684	20.0	35.0	33.5	8	10	8	0	NW. 3.	0	High gusts of wind, accompanied by snow; ceased snowing at 7 p. m.
		2	.....	.....	26.815	.....	.....	24.5	.....	.....	0	.....	.....	0	Clear and pleasant.
		3	26.780	26.661	26.668	18.5	25.0	21.5	0	10	10	0	0	0	Cloudy with appearance of snow.
		4	26.869	26.842	26.859	15.0	26.0	19.0	0	0	0	0	0	0	Clear and cool.
		5	26.927	26.720	26.848	18.5	27.5	20.0	1	1	2	0	0	0	Clear and pleasant.
		6	26.854	26.765	26.831	15.0	34.5	21.0	4	2	3	0	0	0	Clear and cold.
		7	26.808	26.766	26.763	12.0	27.0	24.5	2	5	9	SW. 1.	NW. 1.	0	Cloudy; appearance of snow.
		8	26.815	26.804	26.876	20.0	34.0	25.5	0	6	8	E. 1...	N. 1...	0	Clouds light.
		9	26.883	26.893	26.948	12.5	29.0	17.0	3	4	4	E. 1...	0	0	Clear, cool, and pleasant.
		10	26.997	27.012	27.029	13.5	25.0	25.5	8	10	10	0	0	0	Appearance of snow.
		11	27.096	27.035	.....	21.0	37.5	.....	3	1	.....	0	N. 1...	.....	Cool.
		12	26.915	26.891	.....	20.5	34.0	.....	4	4	.....	NE. 1.	NE. 1.	.....	Fleecy clouds.
		13	26.908	.....	.....	22.0	.....	.....	7	.....	.....	0	.....	.....	Do.
		14	26.872	26.883	26.896	34.5	44.0	30.5	0	0	0	N. 1...	NE. 1.	0	Very pleasant and mild.
		15	26.907	26.810	26.832	34.0	41.5	42.0	8	4	0	W. 1.	NE. 1.	E. 2...	Slight shower in the morning; wind shifting.
		16	26.839	26.873	.....	29.5	41.0	.....	4	4	.....	W. 1.	NE. 3.	.....	Clouds broken.
		17	27.026	27.023	26.996	23.0	29.5	21.0	4	2	0	E. 1...	0	0	High clouds.
		18	27.038	27.015	26.966	13.5	26.0	17.0	0	0	0	SE. 1.	NE. 1.	0	
		19	27.025	26.975	27.100	11.5	23.0	11.5	0	0	0	SE. 1.	NE. 1.	0	
		20	26.808	26.860	26.872	10.0	16.5	11.0	10	0	0	N. 1...	N. 1...	E. 1...	Heavy frost last night; snowed only a little.
		21	26.804	26.671	26.606	12.0	19.0	21.5	0	10	5	0	N. 1...	NE. 2.	Clear in the morning; snowed enough during the evening to cover the ground.
		22	26.606	26.688	26.678	23.0	34.0	31.0	4	10	0	W. 1.	N. 2.	S. 1...	Clouded up this morning, but cleared off by evening.
		23	26.572	26.504	26.524	40.0	45.0	39.0	10	10	3	N. 2...	SW. 2.	0	Rained this morning; showery during forenoon.
		24	26.522	26.492	26.489	37.5	42.5	37.0	10	10	10	N. 1...	SW. 2.	NE. 1.	Showery all day.
		25	26.209	26.271	26.368	36.0	38.0	34.0	10	10	0	N. 1...	NE. 2.	0	Heavy wind from NW., with shower at 10 a. m.; cleared off at 8 p. m.
		26	26.262	26.307	26.370	35.0	32.0	31.0	10	10	5	E. 1...	W. 3.	W. 3...	Cloudy in the morning; snow fell to 1 inch in depth in afternoon; clearing up 9 p. m.
		27	26.591	26.590	26.578	32.0	33.0	32.5	3	10	10	SW. 4.	SW. 4.	W. 4...	Strong SW. wind last night; snowing lightly at 9 p. m.
		28	26.667	26.618	26.585	35.0	39.0	40.5	10	5	3	W. 4.	W. 3.	W. 5.	Snowed all night; moonlight 9 p. m.
		29	26.522	26.454	26.461	46.5	51.0	45.5	7	4	6	SW. 3.	SW. 3.	SW. 5.	Windy, with drifting clouds.
		30	26.418	26.407	26.419	46.0	46.5	42.5	10	5	5	SW. 3.	SW. 4.	W. 3.	High wind last night; cloudy to day.
		31	26.366	26.372	26.336	40.5	43.5	33.0	10	10	10	E. 1.	S. 2...	E. 1...	Snowing at 9 p. m.
		Means.....	26.758	26.716	26.718	24.9	33.8	27.9							
		Monthly mean.....		26.731			28.9								

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No. correspond- ing to profile.	Locality.	Date.	Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	
1	Camp Stevens, Walla-Walla coun- try.	1855. Jan. 1	26.118	26.881	26.009	30.5	29.0	29.5	10	10	10		NE. 2..	N.NE.2	Snowing; depth of snow four inches at 9 p. m.
		2	26.321	26.315	26.444	18.0	24.0	3.0	3	3	2	SW. 1..	SE. 1..	E. 1....	Cloudy; snowing slowly at night.
		3	26.281	26.336	26.376	16.0	16.5	11.5	5	5	10	NE. 1..	N. 1...	N. 1...	Snowing fast.
		4	26.073	26.003	26.115	11.5	11.5	6.0	10	10	5				Snowing slowly in the morning. Starlight, 9 p. m.
		5	26.270	26.047	26.460	3.0	9.5	8.5	10	6	2				Hazy in the morning.
		6	25.520	26.440	26.404	12.5	23.5	24.0	4	10	10	SW. 2..	SW. 2..	S.SW.2..	Snowing, 9 p. m.
		7	26.402	26.248	26.474	27.5	33.0	31.5	10	5	10	S.SW.4..	S.SW.3..	S.SW.1..	Rained this morning; snow all gone. Clear, 9 p. m.
		8	26.619	26.646	26.658	34.0	37.0	31.5	4	9	2	E. 2....	E. SE.2	S. 1....	High wind; squalls of rain.
		9	26.643	26.596	26.772	36.5	39.5	40.0	10	8	2	SW. 2..	0	0	Slight fall of snow last night.
		10	26.757	26.658	26.612	44.0	46.5	39.5	10	7	6	S.W. 2..	SW. 2..	S.SW.3..	
		11	26.522	26.380	26.558	44.0	47.5	37.0	10	3	0	S.SW.3..	S.SW.3..	0	
		12	26.762	26.876	26.930	29.0	34.0	28.5	2	2	0	0	W. 1...	0	
		13	26.900	26.804	26.707	23.0	31.0	28.5	2	5	2	0	E. 1...	0	
		14	26.607	26.654	26.687	39.5	42.0	33.0	10	10	2	S.W. 3..	S.SW.1..	0	
		15	26.433	26.351	26.438	39.5	40.5	38.0	10	10	0	S.SW.1..	S.SW.2..	S.SW.4..	Rainy. Clear, 9 p. m.
		16	26.639	26.628	26.640	34.0	38.0	32.5	8	6	3	S.SW.2..	SE. 1..	0	Slight fall of snow.
		17	26.533	26.443	26.347	37.0	38.5	43.0	10	10	10	SW. 2..	S. 2....	SW. 3..	Raining slowly since daylight.
		18	26.330	26.413	26.395	32.0	38.0	28.0	2	3	10	SW. 2..	SW. 2..	0	High wind last night. Began snowing, 7 p. m.
		19	26.344	26.287	26.366	25.5	26.0	26.0	10	10	8	0	0	S.SW.2..	Snowing.
		20	26.621	26.613	26.656	24.5	27.5	25.0	2	7	5	S.SW.1..	S.SW.2..	0	Snowing in the morning; raining, 9 p. m.
		21		26.516	26.358		28.5	32.5		10	10		S.SW.1..	0	Slowing fast; rained during the night; cleared up this afternoon.
		22	26.323	26.412	26.449	38.0	41.0	40.0	10	10	6	S.SW.2..	SW. 2..	0	Hazy.
		23	26.551	26.538	26.557	47.5	50.5	45.0	10	4	4	S.SW.2..	S.SW.1..	S.SW.1..	Light fleecy clouds; moonlight to-night.
		24	26.644		26.957	44.5		34.5	6		0	0		0	
		25	26.992	26.916	26.774	28.0	41.5	31.0	0	2	8	0	0	0	
		26	26.703	26.702	26.728	44.5	50.5	32.5	6	4	0	S.SW.1..	N. 2...	S. 1....	Winds gusty.
		27	26.752	26.740	26.736	32.0	39.0	32.0	0	0	0	NE. 1..	NE. 1..	S. 1....	Very pleasant.
		28	26.738	26.718	26.740	27.5	42.0	32.0	0	0	0	0	E. 1....	E. 1....	Heavy frost last night.
		29	26.746	26.728	26.753	32.0	40.0								

METEOROLOGICAL REGISTER.

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.		
			Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.					
			7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.			
1	Camp Stevens, Walla-Walla country	1855. Feb.	26.658	26.682	26.785	24.5	37.5	26.5	0	0	0	0	NE. 1...	0	0	0	Heavy frost; light hazy clouds.
2		26.758	26.717	26.741	25.0	36.0	29.5	0	0	2	0	0	0	0	0	0	Rained slowly from 9 a. m. to 3 p. m.
3		26.844	26.812	26.772	27.0	39.0	32.0	0	8	6	0	0	0	0	0	0	Fair.
4		26.765	26.772	26.766	26.5	39.5	48.0	10	10	8	0	N. 1.....	0	0	0	0	
5		26.762	26.635	26.477	40.0	52.0	35.0	5	3	2	0	0	0	0	0	0	Snowed for a few moments at mid-day.
6		26.332	26.311	26.420	41.5	51.0	42.0	6	5	4	0	0	0	0	0	0	Snowed in the morning, but turned into a drizzling rain in the afternoon.
7		26.545	26.542	26.646	35.0	46.0	30.0	8	2	0	0	SW. 1....	.....	0	0	0	Drizzling rain.
8		26.654	.....	26.833	27.5	.....	30.5	5	.....	0	10	0	0	0	0	0	Cleared up in the afternoon.
9		26.647	26.600	26.629	29.0	36.0	42.5	10	10	10	0	0	0	0	0	0	Cool, raw wind.
10		26.541	26.368	26.251	34.0	41.0	36.5	10	10	10	0	S.S.W. 2.	S.S.W. 2.	0	0	0	Squalls of snow and rain.
11		26.286	26.333	.....	39.0	41.5	.....	10	8	.....	2	0	S.S.W. 3.	0	0	0	
12		26.500	26.499	26.521	36.0	42.5	38.0	8	10	2	0	0	S.S.W. 1.	0	0	0	
13		26.604	26.762	26.866	36.0	42.0	30.5	7	6	0	0	0	S.S.W. 2.	0	0	0	Heavy squalls of wind and rain; slightly drizzling rain at 9 p. m.
14		26.910	26.875	26.754	32.0	43.0	32.0	0	1	0	10	0	S.S.W. 2.	0	0	0	
15		26.679	26.744	26.812	38.0	40.5	35.5	6	9	10	0	0	0	0	0	0	Clouded up, but cleared off again towards evening.
16		27.049	27.101	27.124	29.0	39.0	27.5	2	2	0	0	0	0	0	0	0	
17		27.086	27.007	26.801	31.0	34.0	29.0	6	10	4	0	0	S.S.W. 2.	W.N.W. 3	0	0	Snowing in the morning, stopped about 10 a. m.
18		26.574	26.474	26.484	37.5	40.0	32.0	7	10	0	0	NE. 2....	NE. 2....	NE. 2....	NE. 2....	NE. 2....	Gusts of wind during the night.
19		26.544	26.562	26.711	32.5	32.5	12.5	10	10	10	0	0	NE. 2....	NE. 2....	NE. 3. ..	0	High wind last night.
20		26.863	26.758	26.604	6.5	12.5	1.5	0	0	4	0	0	NE. 1....	E. 1.....	0	0	
21		26.672	26.558	26.590	5.0	17.5	12.5	5	3	2	2	0	0	0	NE. 2....	NE. 2....	
22		26.613	26.597	26.589	4.5	12.0	13.0	4	5	2	2	0	N.N.W. 2	N.N.W. 3	N.N.W. 3	0	Cloudy, but pleasant.
23		26.574	26.378	26.508	14.0	25.5	23.5	7	2	2	2	0	0	0	0	0	Light clouds.
24		26.611	26.674	26.802	14.0	20.0	8.5	8	0	2	2	0	0	0	0	0	
25		26.879	26.750	26.718	7.0	19.0	12.5	0	3	2	2	0	0	0	W. 2.....	0	
26		26.633	26.489	26.514	6.0	33.5	28.5	0	0	4	0	0	0	0	W. 1.....	0	
27		26.586	26.616	26.657	30.5	46.5	49.0	8	2	0	0	0	0	0	0	0	
28		26.692	26.602	26.515	24.0	41.0	35.0	10	6	5	0	0	0	0	0	0	
			26.674	26.658	26.663	26.5	35.0	29.0									Means.....
				26.665			30.3										Monthly mean.....

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No correspond- ing to profile.	Locality.	Date.	Barometer corrected.			Open air thermometer.			Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			7 a. m.		9 a. m.		7 a. m.		9 a. m.		7 a. m.		9 p. m.		
			7 a. m.	2 p. m.	9 a. m.	2 p. m.	7 a. m.	2 p. m.	9 p. m.	7 a. m.	2 p. m.	9 p. m.			
1	Camp Stevens, Walla-Walla country	1854. March 1	26.490	26.576	26.754	36.0	49.0	40.5	10	10	7	0	0	W. 2....	Raining slowly.
		2	26.836	26.668	26.723	39.0	53.0	38.0	4	2	2	0	SW. 1..	0	Hazy.
		3	26.553	26.545	26.573	40.0	51.0	38.0	3	6	2	0	SW. 1..	0	Squalls of wind during the morning.
		4	26.554	26.511		45.0	50.0		8	6		SW. 2..		0	Squalls of wind and rain.
		5	26.295	26.260		45.0	52.5	39.5	7	8	4	SW. 2..	S.S.W. 5.	0	Do.
		6	26.508	26.452	26.458	42.5	53.5	42.0	2	10	10	0	0	0	Violent wind last night; commenced raining at sunset.
		7	26.603	26.431	26.550	44.5	51.5	41.0	10	3	0	0	W. 5....	0	Stopped raining about 9 a. m.
		8	26.584	26.568	26.523	87.5	51.0	46.0	0	8	10	0	S.S.W. 2.	0	Clouded up this afternoon; squally.
		9	26.555	26.452	26.448	42.5	51.0	36.5	10	4	0	S. 1.....	NE. 1..	0	Light rain all night.
		10	26.451	26.375	26.415	35.0	45.5	34.5	0	6	10	0	N. 1.....	0	Scattering flakes of snow this afternoon.
		11	26.406	26.371	26.415	29.5	33.0	31.5	10	10	0	0	N. 1.....	0	Ceased snowing at 5 p. m., 1½ inches in depth.
		12	26.464	26.362	26.278	25.5	37.0	29.5	2	4	2	0	0	0	Clear.
		13	26.152	26.130	26.213	27.0	34.0	24.0	10	10	5	0	NE. 1..	S. 1....	Snowing in the mountains; squalls of wind and snow 9 p. m.
		14	26.417	26.387	26.384	23.0	30.5	26.5	8	8	10	0	0	0	Squalls of snow during the day.
		15	26.386	26.402	26.495	25.5	31.5	28.0	8	10	10	0	NE. 2....	0	Snowing in the mountains; snowing in valley since 4 p. m.
		16	26.578	26.585	26.558	24.0	29.0	19.0	10	10	2	0	W. 2....	0	Cloudy; cleared off in the evening.
		17	26.745	26.708	26.706	22.0	31.5	25.0	2	5	0	0	0	0	Light clouds.
		18	26.733	26.657	26.613	24.5	44.5	35.5	0	0	0	0	W. 2....	W. 2..	Delightful weather.
		19	26.697	26.678	26.762	30.0	47.5	38.0	0	1	2	0	W. 2....	0	Do.
		20	26.781	26.697	26.727	40.0	51.0	37.0	3	3	2	0	W. 2....	W. 2....	Do.
		21	26.939	26.907	26.881	37.0	52.0	34.0	2	0	0	0	0	0	Do.
		22	26.915			34.0		36.0	0		0	0		0	Very pleasant.
		23	26.913	26.850	26.850	34.0	61.0	45.0	0	0	2	0	N. 1.	0	Hazy.
		24	26.893	26.845	26.760	32.0	60.0	40.0	0	4	3	0	0	0	
		25	26.786	26.727	26.865	36.0	57.0	38.0	5	3	2	0	N. 2.....	W. 2....	
		26	26.927	26.849	26.817	25.5	48.0								

APPENDIX B—Continued.

[illegible]

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.	
1	Camp Stevens, Walla-Walla country	1855. June 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		6	28.603	28.500	28.512	28.538	51	83	67	67	4	4	6	S. 1....	NE. 1. .	N. 1....	
		7	28.510	28.424	28.449	28.464	56	74	68	66	7	9	6	0	SW. 1...	SE 1....	
		8	28.696	28.548	28.574	28.606	53	76	65	64.7	1	4	4	SW. 1...	E. 1....	E. 1....	
		9	28.643	28.409	28.434	28.495	51	88	73	70.7	0	1	1	W. 6. S. 1	0	0	
		10	28.547	28.499	28.442	28.496	61	89	75	75.0	2	3	8	0	0	0	Dark clouds southwest.
		11	28.360	28.286	28.407	28.351	64	89	72	75	8	5	7	0	0	E. 1. ...	
		12	28.430	28.327	28.340	28.332	56	81	59	65.3	8	8	10	S. 1....	.....	W. 1....	Rain since 4 o'clock.
		13	28.495	28.776	28.816	28.696	50	53	53	52	10	10	9	SW. 6...	W. by S. 2.	W. by S. 1.	Rain ceased at sunset.
		14	28.879	28.663	28.637	28.726	49	66	57	57	4	4	2	W. 1....	S. 1....	0	
		15	28.663	28.509	28.537	28.569	50	68	57	58.3	1	7	9	0	W. 1....	0	
		16	28.593	28.552	28.302	28.392	51	62	47	53.3	8	9	9	S. 1....	S. 1....	0	
		17	28.252			28.252	52			52	9			S. 1....			

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APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths			Wind—direction and force			Daily remarks on the weather.
			Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.	
48	Camp at Bitter Root, Treaty Ground.	1855. July 1															Very strong wind; gusts commenced at 1½ p. m. Wind in gusts in the afternoon. Mild, with strong gusts of wind. Foggy at sunrise; strong wind since 7 a. m. Thick fog until an hour after sunrise; broken cloud during the day. Broken clouds; misty in the mountains to the SE. Very foggy at sunrise.
		2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		10	.....	26.906	26.864	26.885	.....	89	73	81	.....	4	5	S. 1....	W. 3....	0	
		11	.....	26.813	26.778	26.831	48	93	84	75	5	5	0	E. 1....	W. 7....	W. 3....	
		12	26.901	26.813	26.778	26.831	54	92	80	75.3	8	6	3	W. 1....	W. 6....	W. 3....	
		13	26.768	26.589	26.585	26.647	46	78	66	63.3	3	3	2	E. 1....	W. 7....	N. 1....	
		14	26.576	26.525	26.541	26.544	50	66	58	58	5	8	2	N. 2....	W. 6....	E. 1....	
		15	26.603	26.724	26.739	26.689	36	81	64	60.3	.....	5	5	E. 1....	W. 2....	E. 2....	
		16	26.810	26.704	26.705	26.740	49	79	71	66	6	6	1	E. 1....	N. 5....	W. 1....	
		17	26.836	26.862	26.880	26.859	42	.....	.....	42	1	.....	.....	.....	.....	.....	
		18	27.027	.....	.....	27.027	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		28	27.182	27.202	27.206	27.197	49	67	57	57.7	7	8	1	S. 1....	SW. 4....	0	
		29	27.153	27.016	26.962	27.044	40	82	63	61.7	2	1	1	0	W. 1....	0	
		30	27.051	26.986	27.023	27.020	51	84	71	68.7	0	2	2	W. 1....	N. 4....	N. 4....	
		31	27.137	26.118	27.159	27.138	49	68	60	59	1	9	9	0	N. 4....	NE. 4....	
101	Camp at Teton river.....																Teton. Pleasant. Slight rain at 8 a. m.; appearance of shower at 2½. Foggy in morning; pleasant during the day. Gusty; compact clouds all around the horizon. Lower clouds are dark and broken; upper clouds are light.

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.		
			Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.			
113	Camp on the Teton river, two miles from Fort Benton.	1854. Aug. 1	27.057	27.090	27.157	27.101	51	62	56	56.3	10	9	10	0	N. 4.	N. 7. ...	Slow rain in the morning; rained again in the evening.		
		2	27.238	27.262	27.282	27.261	54	67	59	60	10	5	0	0	NE. 1. ...	0	Rain ceased at sunrise; clear and warm at 2 p. m.		
		3	27.311	27.198	27.191	27.233	52	78	71	67	5	5	1	E. 1. ...	E. 4.	E. 3. ...	Warm and windy.		
		4	27.208	27.098	27.080	27.126	49	88	73	70	0	6	4	0	0	0	0	Foggy this morning; thunder shower after sunset.	
		5	27.137	27.161	27.024	27.107	50	83	69	67.3	1	2	2	W. 1. ...	0	0	0	Warm and pleasant.	
		6	27.051	26.913	27.102	27.022	55	76	50	63.3	5	5	9	0	N. 5.	SW. 4. ...	Wind and rain from 4 to 6 p. m.		
		7	27.153	27.142	27.148	27.148	52	73	60	61.7	2	2	8	SW. 5. ...	S. 1.	N. 4. ...	Thunder shower at 9 p. m.		
		8	27.210	27.131	28.065	27.135	54	75	65	64.3	2	3	7	W. 2. ...	E. 2.	0			
		9	27.034	26.990	26.992	27.005	59	68	56	61	9	6	9	N. 1. ...	N. 4.	N. 1. ...	Raining at 5 p. m.; thundering in the north.		
		10	27.134	27.114	27.123	27.124	45	57	51	51	10	5	2	N. 5. ...	N. 3.	0	Rained last night; some rain at 11 a. m.		
		11	27.129	27.088	26.922	27.046	43	65	55	54.3	4	3	2	0	E. 1.	0	0	Weather changeable to-day.	
		12	27.146	27.230	27.212	27.196	45	65.8	60	66.9	9	6	8	0	N. 2.	0	0		
		13	27.292	27.324	27.288	29.301	51	64.5	58	57.8	9	9	10	NE. 2. ...	NW. 1. ...	NW. 2	Rained last night.		
		14	27.292	27.286	27.263	27.280	50	61	59	56.6	10	10	3	W. 1. ...	NW 1. ...	N. 1. ...	Few drops of rain this morning.		
		15	27.247	27.214	27.371	27.277	46	74	55.5	58.5	4	6	8	W. 1. ...	N. 1.	NE 6. ...	Strong wind during the day.		
		16	27.386	27.346	27.264	27.332	39	71.5	67	59.2	0	0	0	0	0	E. 1.	NE. 1. ...		
		17	27.290	27.198	27.070	27.193	44	80	70	64.6	0	0	2	0	0	0	E. 1. ...	E. 1. ...	
		18	27.032	26.852	26.973	26.952	55	85	70	70	0	0	1	0	0	N. NE. 1	0	Hazy during the day.	
		19	27.214	27.145	27.235	27.198	55	67	53	58.3	9	5	1	N. NE. 3	N. 4.	N. 1. ...	Several loose pieces of glass in the tube of the barometer.		
		20	27.322	27.246	27.234	27.267	50	74	66	63.3	10	0	0	S. 1.	N. by E. 1	E. 2. ...	Hazy atmosphere.		
		21	27.241	27.143	27.132	27.172	43	86	65	63.6	1	0	2	0	0	W. 1.	NE. 1. ...		
		22	27.177	27.279	27.263	27.239	52	76	67	65	1	1	2	S. by W. 1	E. 1.	E 1. ...			
		23	27.281	27.279	27.252	27.271	52	79	68	66.3	3	1	3	E. 1. ...	NE. 2. ...	E. 3. ...	Hazy.		
		24	27.142	27.260	27.356	27.253	55	62	50	55.7	3	6	9	0	0	W. SW. 5.	W. 2. ...	Slight rain at 4 p. m.	
		25	27.365	27.202	27.169	27.265	42	68	61	57	9	1	4	E. 2. ...	E. 6.	E. 6. ...	Cold and windy all day.		
		26	27.315	27.326	27.316	27.319	42	74	68	61.3	1	0	6	E. 1. ...	E. by N. 1	E. 1. ...	Hazy.		
		27	27.350	27.173	27.147	27.223	44	81	71	65.3	1	0	1	S. 1. ...	E. 1. ...	NE. 1. ...	Id.		
		28	27.284	27.221	27.209	27.238	48	71	62	60.3	2	0	1	N. 1. ...	NE. 2.	NE. 3. ...			
		29	27.207	27.092	27.106	27.135	53	69	60	60.7	9	3	4	E. 1. ...	E. 2.	E. 3. ...			
		30	27.105	27.146	27.139	27.130	53	55	52	53.3	10	10	2	NW. 1. ...	SW. 3. ...	S. 5.	Rain since 12½ p. m.; clear and windy at sunset.		
		31	27.233	.....	.....	.....	47	.....	.....	47	1	.....	.....	S. 4. ....	.....	.....	Windy last night.		
114	Missouri river, ½ mile above Fort Benton.																		

114 Missouri river, ½ mile above Fort Benton.

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			Sunrise.	2 p. m.	Sunset.	Daily mean.	7 a. m.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.	
114	Missouri river, $\frac{1}{4}$ mile above Fort Benton.	1855. Sept. 1															Clear and pleasant. Slight rain in the morning; cleared off at 12 m. Cool, cloudy, and windy in the morning; clear and pleasant at night. Bright and pleasant. Clouds in the horizon during the day; concentrating into one mass 9 p. m. Raining at daylight until sunrise; some rain at 8 a. m. Dark and cold this morning. Bright and pleasant. Wind ceased at sunset. Cloudy, with cold wind; clearing off at 9 p. m. Rain this morning ceased about sunrise; squally during the day. Snowed at 6½ a. m.; changed into a slow rain, which ceased before sunset. Misty, and appears to be clearing off this morning. Wind blew from 6½ a. m. until about 4 p. m. A few drops of rain after sunset. Wind ceased after sunset; clouds in large masses during the day. Thin and light clouds towards the horizon. Overcast in the morning; scattering clouds during the day. Wind since 9 a. m. A few drops of rain at 2 p. m.; gusts of wind from 2 to 4. Rained last night. Raining at sunset.
		2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
		6	27.337	27.328	27.327	27.331	52	60	52	54.7	10	1	1	E. 1.....	E. 3.....	SW. 1....	
		7	27.261	27.260	27.295	27.272	53	76	65	64.7	8	1	1	SW. 5....	W. SW. 6	W. by S. 2	
		8	27.357	27.203	27.142	27.234	42	86	57	65	0	0	0	SW. 1....	SW. 1....	E. 1.....	
		9	27.264	27.158	27.158	27.193	48	67	64	59.7	1	3	8	SW. 2....	N. 1.....	N. 1.....	
		10	27.201	27.366	27.447	27.338	52	54	46	50.7	8	9	4	W. 2....	0	W. 6....	
		11	27.504	27.492	27.396	27.464	43	27.5	49	39.8	10	1	0	NE. 1....	NW. 1....	N. 1.....	
		12	27.327	27.173	27.208	27.236	32	71	59	54	1	1	1	S. by E. 1.	N. 1.....	N. 1.....	
		13	27.394	.....	.....	.....	42	.....	47	44.5	10	.....	.....	W. 1....	.....	NW. 1....	
		14	27.355	27.168	27.183	27.235	24	59	51	44.7	8	7	4	E. 4.....	N. 1.....	NE. 3....	
		15	27.220	27.043	27.040	27.101	40	66	59	55	9	9	10	SE. 1....	NE. by N. 5	0	
		16	27.007	27.022	27.074	27.034	47	58	53	52.6	10	10	5	W. 1....	SW. by S. 4	W. by S. 4	
		17	27.191	27.311	27.341	27.281	47	47	46	46.6	10	10	10	W. SW. 1	NE. 6....	NE. 6....	
		18	27.448	27.396	27.411	27.418	35	38	36	39.3	10	10	10	N. 6.....	NE. by N. 6	E. 4....	
		19	27.324	27.214	27.208	27.249	33	56	50	46.3	8	9	9	NW. 1....	S. 4.....	S. 4.....	
		20	27.205	27.150	27.147	27.167	34	70	57	53.7	1	4	2	E. 1....	SW. 5....	SW. 1....	
		21	27.202	27.130	27.114	27.149	40	67	55	54	1	7	9	0	W. 2....	NW. 2....	
		22	27.211	27.141	27.216	27.189	43	62	52	52.3	4	3	5	SW. 1....	SW. 4....	W. 5....	
		23	27.251	27.072	27.005	27.109	27	65	56	49.3	0	2	5	0	E. 3.....	E. 1.....	
		24	27.001	27.112	27.220	27.111	52	65	55	57.3	9	5	2	SW. 6....	W. by S. 6	W. 6....	
		25	27.550	27.555	27.491	27.532	44	61	52	52.3	1	1	1	W. 5....	W. 1....	E. 1.....	
		26	27.337	27.103	27.048	27.163	32	80	69	60.3	0	1	1	0	S. by W. 5	SW. 4....	
		27	26.892	26.805	26.912	26.869	45	67	55	55.7	7	9	8	0	W. by S. 7	0	
		28	27.233	27.224	27.203	27.220	41	57	51	49.7	9	7	5	SW. 4....	SW. 2....	W. 1....	
		29	27.108	27.046	27.069	27.074	50	65	58	57.7	6	6	9	SW. 4....	SW. 6....	SW. 5....	
		30	27.397	27.407	27.351	27.385	43	65	56	54.7	9	8	5	W. 1....	W. 2....	W. 1....	

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths.			Wind—direction and force.			Daily remarks on the weather.
			Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.	
§ 4	114 Missouri river, $\frac{1}{4}$ mile above Fort Benton.	1855.															
		Oct. 1	27.382	27.283	27.274	27.313	50	76	64	63.3	2	1	1	SW. 1...	SW. 4...	W. 1.....	Missouri, $\frac{1}{4}$ mile up river from Fort Benton.
		2	27.247	27.040	26.984	27.090	45	84	68	65.7	2	2	3	0	W. 5....	W. 2.....	
		3	27.331	27.296	27.351	27.326	42	48	41	43.7	10	9	9	W. 1.....	N. 2.....	N. 4.....	Raining this morning.
		4	27.494	27.432	27.464	27.463	26	45	34	35	1	5	2	W. 4.....	W. 5.....	S. 4	Rained slowly last night; bright and cold this morning.
		5	27.520	27.389	27.367	27.425	17	53	46	38.7	2	3	10	0	SW. 2....	0	
		6	27.346	27.262	27.211	27.273	39	72	57	56	0	1	2	SW. 4....	S. 6, W. 5	SW. 2....	
		7	27.382	27.203	27.203	27.246	37	81	66	61.3	1	0	0	0	S. 6, W. 5	S. 6, W. 3	Clear and pleasant.
		8	27.216	27.064	27.119	27.140	40	83	71	64.3	0	2	9	E. 1....	SW. 5....	W. 5....	
		9	27.213	27.308	27.438	27.320	42	68	58	56	1	5	6	SE. 1....	W. 6....	N. 5....	
		10	27.815				31				2			E. 1....			
		11															
		12															
		13															
		14															
		15															
		16															
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		21															
		22															
		23															
		24															
		25															
		26	27.225	27.126	27.102	27.151	52	66	61		2	5	4	W. 6....	W. 7....	W. 6....	Clouds are high, thin, and scattered.
		27	27.332	27.178	27.140	27.217	49	55	56	.....	4	5	5	S. 1....	N. 1....	N. 1....	
		28	26.984	.....	27.124	.....	61	.....	32	.....	9	.....	10	S. 6....	.....	N. 5....	Snow storm at sunset.
	3 Teton river, 14 miles from Fort Benton.	29	27.218	.....	27.773	.....	12	.....	29	.....	.....	.....	6	E. 1....	.....	S. 2....	Two and a half inches of snow fell last night; foggy this morning.
	4 Teton river, $31\frac{1}{4}$ miles from Fort Benton.	30	27.497	27.661	27.706	27.621	43	40	36	.....	2	2	2	S. 1....	W. 6....	W. 4....	
		31	27.764	27.717	27.696	27.726	35	51	45	.....	1	2	10	SW. 5....	SW. 5....	S. 5....	Clouded up at sunset.

APPENDIX B—Continued.

No. corresponding to profile.	Locality.	Date.	Barometer corrected.				Open air thermometer.				Cloudiness in tenths			Wind—direction and force.			Daily remarks on the weather.
			Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Daily mean.	Sunrise.	2 p. m.	Sunset.	Sunrise.	2 p. m.	Sunset.	
4	Teton river, 31½ miles from Fort Benton.	1855.															One inch of snow fell last night.
		Nov. 1	27.584	27.594	27.652	27.607	39	50	40	43	1	9	9	SW. 6...	NW. 4 ..	N. 3. ...	
		2	27.077	27.027	26.964	27.023	28	38	34	33.3	4	1	1	W. 3....	SW. 4...	S. 4.....	
		3	26.739	26.534	26.495	26.589	33	50	43	42	2	2	4	S. 6, W. 6.	S. 6.....	S. 6.....	
		4	26.568		26.591	26.386	36		28	32	9		2	NW. 4..		W. 4....	
		5	26.473				13				0			0			

Senate documents

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